WAVESTATION

ADVANCED VECTOR SYNTHESIS · WAVE SEQUENCING

Player's Guide

by Stanley Jungleib and Dan Phillips

A/D

KORG
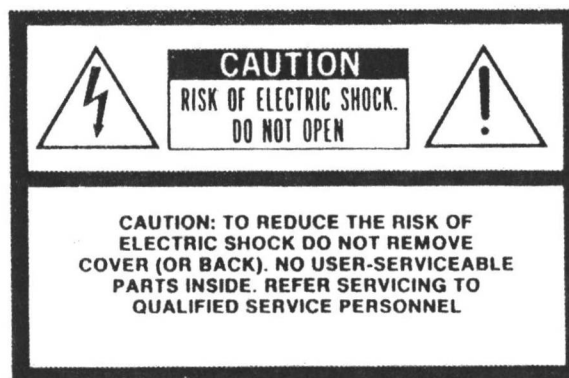
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IMPORTANT SAFETY INSTRUCTIONS

WARNING—When using electric products, basic precautions should always be followed, including the following:

1. Read all the instructions before using the product.

2. To reduce the risk of injury, close supervision is necessary when a product is used near children.

3. Do not use this product near water—for example, near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool, or the like.

4. This product should be used only with a cart or stand that is recommended by the manufacturer.

5. This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.

6. The product should be located so that its location or position does not interfere with its proper ventilation.

7. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.

8. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.

9. The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time.

10. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

11. The product should be serviced by qualified service personnel when:

    A. The power-supply cord or the plug has been damaged; or

    B. Objects have fallen, or liquid has been spilled into the product; or

    C. The product has been exposed to rain; or

    D. The product does not appear to operate normally or exhibits a marked change in performance; or

    E. The product has been dropped, or the enclosure damaged.

12. Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.

SAVE THESE INSTRUCTIONS

CAUTION
RISK OF ELECTRIC SHOCK.
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF
ELECTRIC SHOCK DO NOT REMOVE
COVER (OR BACK). NO USER-SERVICEABLE
PARTS INSIDE. REFER SERVICING TO
QUALIFIED SERVICE PERSONNEL

> *Thank you for purchasing the KORG Wavestation. To ensure years of trouble-free operation, please read this manual and the accompanying reference guide carefully, and keep them handy.*

PRECAUTIONS

■ **ENVIRONMENT**

Avoid exposing this unit to the following conditions:
- Direct sunlight.
- High temperature or humidity.
- Dust or sand.
- Excessive vibration.

Using your unit near fluorescent lights or CRTs (in TVs, etc.) may generate noise or cause erroneous operation, so please be careful.

■ **POWER SUPPLY**

Use this unit only with the rated AC voltage. If you intend to use this unit in areas where the voltage is different from the rated AC voltage, consult your KORG dealer about a suitable voltage transformer.

Do not plug this instrument into the same outlet used for devices which generate noise or which have a large power consumption, such as motors or dimmers.

■ **INTERFERENCE WITH OTHER APPLIANCES**

This unit uses microprocessor circuitry that may cause interference with nearby radio or TV receivers. If problems occur, use at a greater distance from the radio or TV.

■ **HANDLE GENTLY**

Although this unit is designed and constructed to KORG's high standards, the use of excessive force may damage its keys and knobs.

■ **CLEANING**

Use only a soft, dry cloth to clean the exterior of this unit. Never use benzene, volatile cleaners or solvents, polish or cleaning compounds.

OWNER'S MANUAL

Every attempt at accuracy has been made. However, specifications and operations are subject to change without notice. In case of difficulty, please contact your authorized KORG dealer.

THE BACKUP BATTERY

The Wavestation contains a lithium battery that preserves its memory settings when the power is switched off. When (in a few years) the display indicates "Battery Low", please contact your dealer or a KORG service center for replacement.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

The lightning flash with arrowhead symbol within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

GROUNDING INSTRUCTIONS

This product must be grounded. If it should malfunction or break down, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER—Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with the product—if it does not fit the outlet, have a proper outlet installed by a qualified electrician.

TABLE OF CONTENTS

1 WAVESTATION A/D OVERVIEW

1.1 INSTANT GRATIFICATION

For those who have some experience with synthesizers, here are the briefest possible instructions. For complete instructions, please see Chapter 4.

☛ Connect the Wavestation A/D to your master controller and audio system, and switch everything on.

☛ Play the Wavestation A/D with your controller, and select new Performances by turning the dial.

☛ To switch memory banks, press the BANK soft key (the first switch under the display).

To edit:

☛ Select the desired page using the soft keys.

☛ Select the desired parameter field using the cursors.

☛ Set the desired value for the parameter using the dial (or keypad).

The remaining sections in this chapter explain the organization of this manual and define a few common terms. Most of these terms have to do with the way that the Wavestation A/D's sound resources are organized.

Figure 1-1 Player's Guide Overview
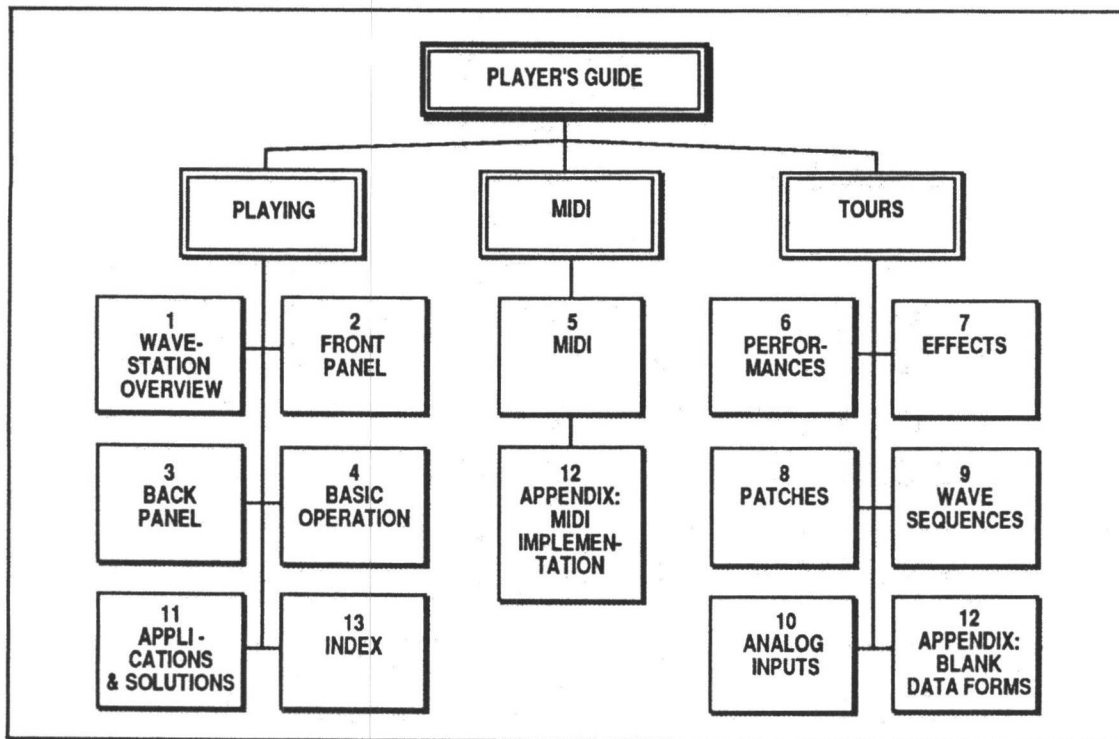
1.2 ABOUT THIS MANUAL

Figure 1-1 (on the previous page) shows how this Player's Guide is organized. This guide enables you to quickly set up and use the KORG Wavestation A/D. It explains all the basic operations you might need to perform when you use the Wavestation A/D in a variety of musical settings.

This guide does not cover programming custom sounds in depth. However, the Tour chapters (6 through 10) do introduce the Wavestation A/D's editing controls. They show you where to go to immediately make the most useful changes -- such as editing filter brightness or amplifier velocity response -- or to play with the fun things like Vector Synthesis, Wave Sequencing, and the Analog Inputs.

After familiarizing yourself with the Wavestation A/D using this guide, or if you require more information about any display page, please see the accompanying Wavestation A/D Reference Guide.

1.3 WHAT IS A BANK?

The Wavestation A/D has internal memory banks RAM1, RAM2, RAM3, ROM, and, if used, a plug-in CARD bank.

For a closer look at the banks, please see Figure 1-2.

Figure 1-2 Wavestation A/D Memory Banks - Program Data
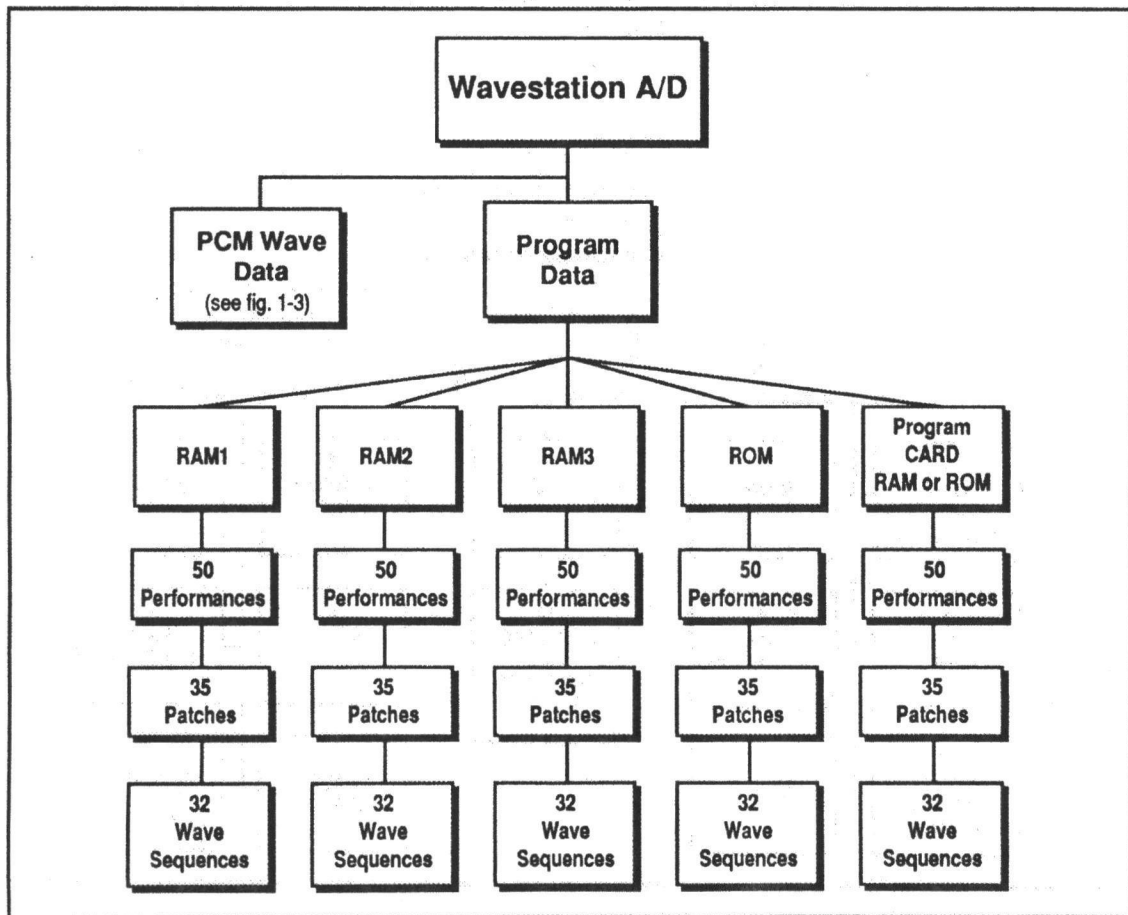
The ROM bank contains fixed factory sounds and their source material; it can't be changed.

RAM1, RAM2, and RAM3 are your work areas for custom sounds, although initially they are set with more factory sounds. The RAM banks are backed up with a long-life lithium battery (if the internal battery voltage drops, a warning appears).

Each bank contains 50 Performances, 35 Patches, and 32 Wave Sequences. In addition, there is a ROM wave memory of 484 PCM Waves.

Cards allow you to build up a library of sounds, and can also be used for quick backup. There are two types of cards for the different types of sound data. PROGRAM DATA RAM or ROM cards store Performances, Patches, and Wave Sequences; PCM ROM cards contain sampled PCM Waves.

Figure 1-3 Wavestation A/D Memory Banks - PCM Wave Data
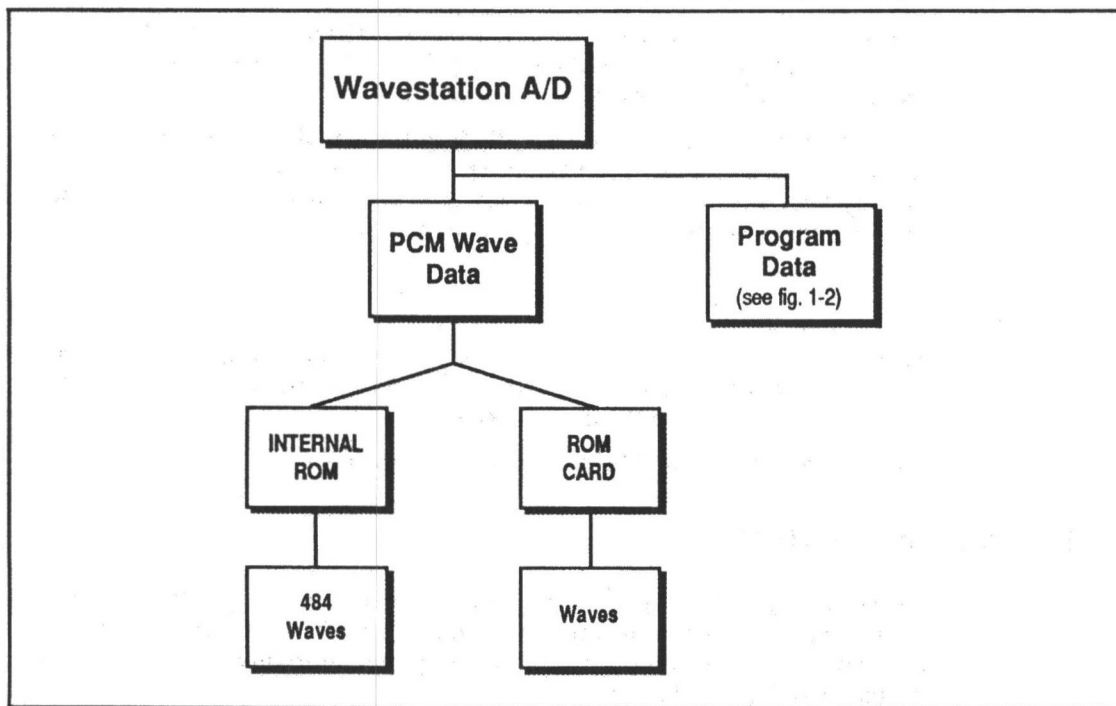
Let's look briefly at each of these kinds of sound data.

1.4 WHAT IS A PERFORMANCE?

The simplest answer is that Performances are the highest level of sound control in the Wavestation A/D. Performances have no sounds in themselves, but organize and add effects to Patches, which do create sounds.

Besides specifying the Patches being played, Performances also control important parameters such as the keyboard mode (single, split, or layered, with or without velocity-controlled mixing), and a pair of effects settings.

There are 50 Performances in each bank, so you have a minimum of 200 Performances available - 250 if a Performance Card is in use.

Please see Figure 1-4.

Figure 1-4 Performance Structure
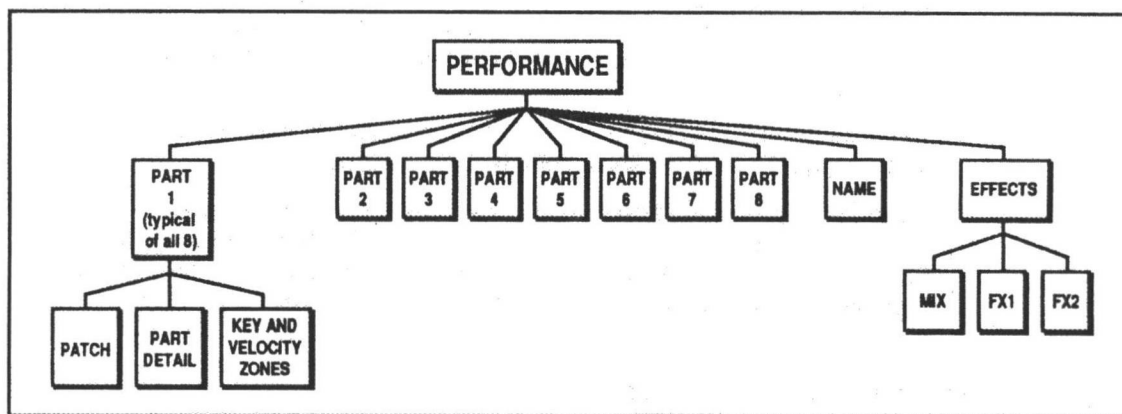
Performances consist of eight Parts. Each Part is a Patch together with some adjusting parameters (PERFORMANCE PART DETAILS) and a playback range (KEY AND VELOCITY ZONES).

Because they have up to eight Parts, Performances multiply the sonic richness and detail of a sound. As you play, listen for how the factory Performances employ their Patches; for example, how the Patches may be layered, assigned to specific ranges of MIDI notes for splits, or switched in with different velocities.

Effects

Each Performance also memorizes an effects and output routing configuration, two effects program selections for the twin effects processors, and all of the parameters contained in those two effects.

To learn more about the Effects, please see Chapter 7.

1.5   WHAT IS A PATCH?

Patches are specific setups for the synthesizer voices, which produce roughly the equivalent of an instrumental sound. Each patch can have 1, 2, or 4 voices, and each voice contains an oscillator, filter, amplifier, amplifier envelope, general purpose envelope, and two LFOs.

Figure 1-5 A Voice Patch
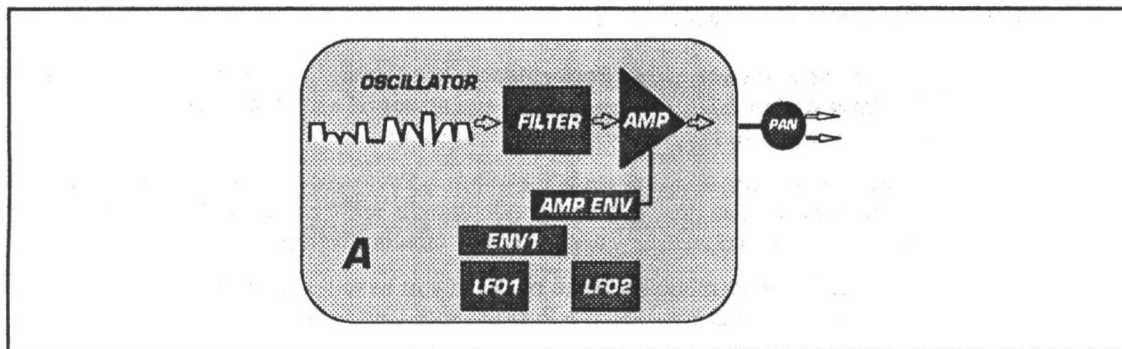
Each Bank holds 35 Patches, for a total of 175 (with a ROM or RAM card inserted).

To hear an individual Patch you can:

☞   Select a Performance which has only one Part.

☞   Select a SOLO function for any Part.

For more about Patches, please see Chapter 8 and the Reference Guide.

1.6   WHAT IS A WAVE?

For their raw sonic material, Patches rely on specific PCM waves played by their oscillators. PCM stands for Pulse Code Modulation, which is a common way of storing audio in digital form.

There are 484 internal wave choices available, and more can be accessed via optional PCM Cards. Each wave has a unique timbre. Waves can be single-cycle or few-cycle waveforms that loop continuously, sampled transients followed by loops, or sampled transients which play only once.

For more about waves, please see Chapter 8.

1.7   WHAT IS A WAVE SEQUENCE?

A Wave Sequence is simply a list which allows an oscillator to play specific PCM waves in succession. Each step of the sequence can be given a specific duration -- or be controlled by the *gate time* during which a key is held down.

Also, Wave Sequence steps can be crossfaded, and thus smoothed together. The Wavestation and Wavestation A/D are the first instruments to offer Wave Sequencing.

Each Bank holds 32 Wave Sequences, for a total of 128. The total Wave Sequence Step memory per bank is 500 steps, for a total of 2500 (with an optional RAM CARD). One Wave Sequence can have up to 255 steps.

For more about Wave Sequences, please see Chapter 9.

2 *FRONT PANEL*

2.1 GENERAL

This chapter identifies and describes all controls and displays on the front panel.

There are three main types of player's controls:

• performer's controls, which you normally use while playing

• display controls, which choose the display pages and parameter value fields

• data entry controls, which change the values of parameters

After you use the menu system to arrive at the desired *page* and the cursors to select the desired *parameter* on that page, use the data entry controls to adjust the parameter *value*.

Figure 2-1 Front Panel
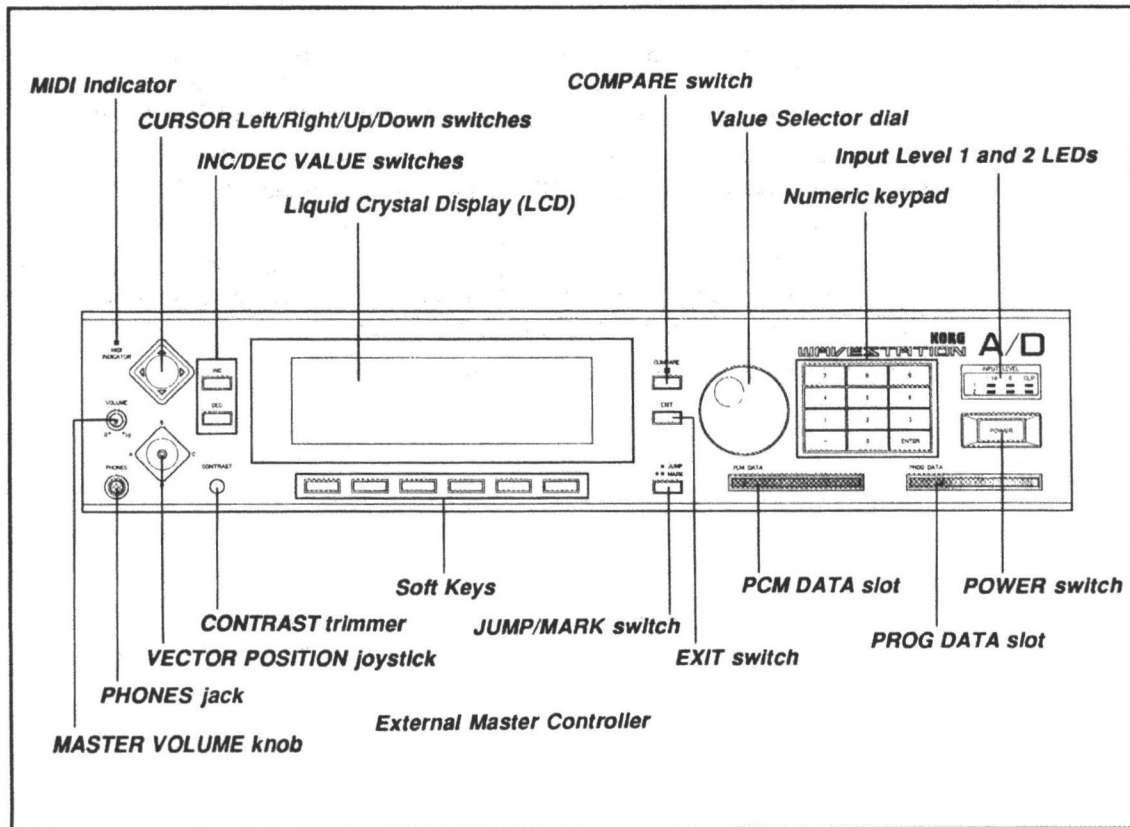
2.2 PERFORMER'S CONTROLS

VECTOR POSITION joystick

The joystick is used for mixing the four oscillators A/B/C/D. While programming, the joystick allows you to pick mixer envelope points that correspond to a mixture of specific timbres. For example, when centered, the oscillators are mixed equally.

In performance, the joystick allows you to temporarily override the programmed mixture with a spontaneous mix position.

In MIDI MULTI and MONO modes, local and incoming MIDI controllers are kept separate, so that the sound will not be affected by moving the local joystick unless it is being routed back to the Wavestation A/D via MIDI. In OMNI and POLY modes, both the local joystick and incoming MIDI are recognized.

The MIDI REMAP page, discussed below, allows you to use MIDI controllers for Joystick movements. Even if your controller doesn't have a joystick, you may still be able to use a combination of other controllers (wheels, sliders, footpedals, etc.) for this purpose.

MASTER VOLUME knob

This control sets the stereo output level (jacks 1/L and 2/R, and Balanced 1/L and 2/R). It does not affect the individual outputs (jacks 3 and 4).

External Master Controller

Since this is a rack-mount module, many aspects of performance depend on the capabilities of your master controller. If your controller does not send aftertouch, for instance, then the Wavestation A/D will not receive any aftertouch data. For more information on using your master controller with the Wavestation A/D, see Section 4, BASIC OPERATION.

2.3 DISPLAYS

Liquid Crystal Display (LCD)

This 8-line by 40-character (64 x 240 pixels) back-lit LCD makes the Wavestation A/D a pleasure to use. Operation is generally simple, because the display guides you through each task.

The display shows the function of the programmable soft keys, and shows important concepts graphically. Data is presented in sets of related parameters called *pages*. A page generally contains a title, a list of parameters and other data, and a line of labels for the soft keys. (An occasional downward-pointing arrow in the upper right hand corner reminds you when a parameter list can be scrolled downwards.)

Input Level 1 and 2 LEDs

These two sets of three LEDs each display the levels of the signals at the Analog Inputs. The leftmost LEDs show that their respective Inputs are receiving a low signal (-10dB), the middle LEDs show the optimum level (-3dB), and the rightmost LEDs show that the signal is clipping. The clipping LEDs stay lit for about half of a second, so that you can easily see that clipping has occurred.

MIDI Indicator

This LED lights up whenever the Wavestation A/D receives any MIDI data which it has been set to recognize. This can be very useful when troubleshooting your MIDI setup.

In MIDI OMNI mode, all data is recognized, and so the LED will light whenever any MIDI data is received.

In MIDI POLY mode, only data received on the Basic Channel will cause the LED to be lit; all other data is ignored.

In MIDI MULTI mode, only data received on channels set to ON will cause the LED to be lit.

In MIDI MONO mode, only data received on the specified number of channels will cause the LED to be lit.

The exception to the above is MIDI Volume (controller #7) on the two Analog Input Channels; this is always received, regardless of any other settings.

2.4   DISPLAY CONTROLS

Soft Keys

These switches sit directly under the display. Their labels and functions change according to the specific page. Soft keys are always referred to by their current label.

Generally, the soft keys move you around within the Wavestation A/D's editing hierarchy. There is a great difference between this approach and previous interfaces. Instead of having to learn what controls you need for a situation, you guide yourself to the correct control by selecting functions of interest. Along the way, the menu system prevents confusion by displaying only relevant choices.

CURSOR Left/Right/Up/Down switches

On any given page, use the four cursor switches to direct the cursor to the desired parameter for editing. When a parameter value field is selected, it appears in reverse video (white on black).

COMPARE switch

To prevent the accidental loss of desired edits, an edited Performance, Patch, Multi-mode Setup, or User Scale is always held in its own memory area (called a *buffer*.) When you edit, the COMPARE LED lights. If you press the COMPARE button, the LED will turn off, and you will hear the unedited version. Pressing

COMPARE again brings back the edited version. This may be repeated as many times as you wish.

EXIT switch

This switch always returns you to the previous menu level. It can also be thought of as a "CANCEL" function for the current page.

JUMP/MARK switch

This switch lets you set "bookmarks" on up to six display pages and move directly between them, thus bypassing the standard menu system. This can be especially useful for repetitive tasks or frequently-used adjustments.

Single-clicking calls the JUMP page. Double-clicking calls the MARK page.

2.5   DATA ENTRY CONTROLS

The three sections of the Data Entry Controls - dial, numeric keypad, and Inc/Dec buttons - all affect data in the same way. They each have their advantages - the dial is useful for sweeping through a large range of values, the Inc/Dec buttons are good for fine adjustments, and the numeric keypad makes it easy to quickly enter an exact value. You may find that you prefer specific data entry controls for specific situations.

Value Selector dial

The current display page programs the function of the infinite-turn dial. On the PERFORMANCE SELECT page, the dial scrolls through the Performances in the current Bank. On most pages, the dial is the easiest way to adjust parameter values. You select the parameter assigned to the dial by using the cursor switches. Values can be numbers, but they are just as often options described by words.

The dial causes relative change from the current setting. It has no absolute position.

INC/DEC VALUE switches

For fine adjustments, you may prefer to use these switches. They make it easy to step through all of the possible values, one by one.

Numeric keypad

The keypad contains the numbers 0-9, a negative sign (-), and ENTER. It can be used for direct entry of numerical values, as well as for selecting some descriptive values.

After keying the desired digits, you must press ENTER (so that the Wavestation A/D "knows" the number has been entered).

To key in a negative number, press the negative sign (-), type in the desired digits, and then press ENTER.

To cancel an edit, simply select another field with the cursor switches before pressing ENTER (if you've already pressed ENTER, you can still use the COMPARE switch).

2.6   OTHER CONTROLS

CONTRAST trimmer

Adjust this for the most comfortable viewing of the LCD.

POWER switch

The power switch is located on the front panel.

2.7   CARD SLOTS

The two card slots let you expand the sound capability of the Wavestation A/D.

NOTE: Do not insert or remove cards while sound is being produced. Only insert Wavestation-type cards with their labels facing upwards. Program Cards will not work in the PCM Card slot, and vice versa.

PROG DATA slot

RAM or ROM cards in this slot hold Performances, Patch data, and Wave Sequences. For a RAM card, KORG Model MCR-03 is suitable.

PCM DATA slot

ROM cards in this slot hold PCM (*sampled*) waves, which serve as source material for the oscillators.

2.8   OUTPUTS

PHONES jack

A copy of 1/L and 2/R. This standard quarter-inch phone jack accommodates stereo headphones of any impedance. KORG Model KH-1000 is suitable.

3 BACK PANEL

3.1 GENERAL

This chapter identifies and describes components on the back panel.

Figure 3-1 Back Panel
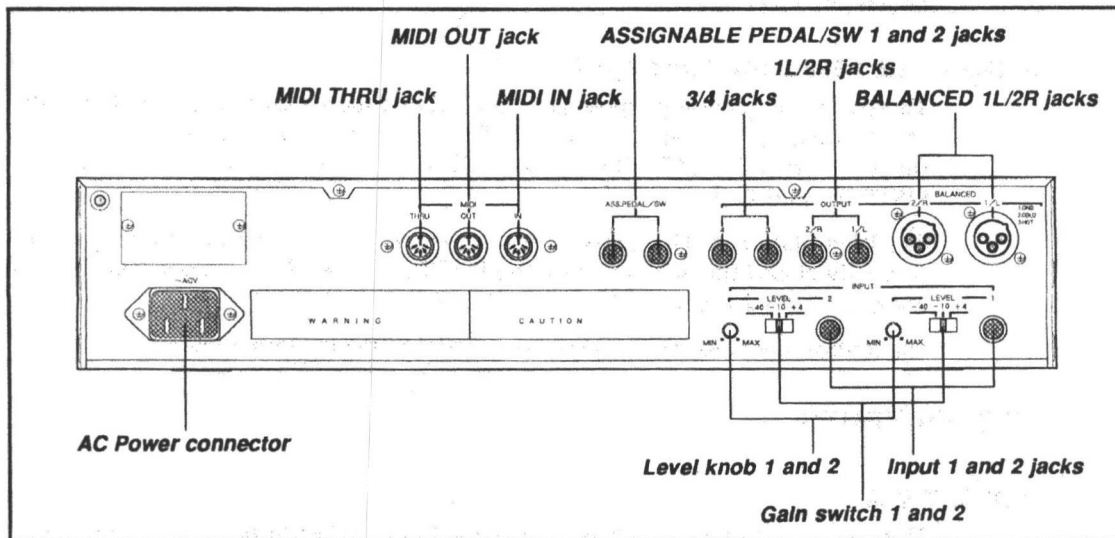
3.2 INPUTS

AC Power connector

A detachable cord is provided.

If in doubt about your line voltage, please contact your dealer.

MIDI IN jack

This input allows the Wavestation A/D to be controlled by a keyboard, sequencer, alternate controller (such as a wind controller, MIDI guitar, or percussion pads), or computer.

Input 1 and 2 jacks

These inputs allow the Wavestation A/D to process audio signals in a variety of ways. External audio signals can be used in Patches, just as if they were PCM waveforms. During recording, mixdown, or in performance, you might also wish to send the signals of external instruments (other keyboards, sound modules, guitars, etc) through the Wavestation A/D's effects, along with the internal sounds. You might sometimes even wish to use the Wavestation A/D as a stand-alone effects processor. Some of the effects, such as the Vocoders, Mod Pitch Shift - Delay, and

the Compressor, are specifically designed to work with the Analog Inputs. For more information, see Section 10, ANALOG INPUTS.

Gain switch 1 and 2

These controls work together with the Level knobs to set the initial gain of the analog inputs. -40 (dBu) should be used for microphones, -10 (dBu) should be used for consumer audio line-level equipment (mixers, synthesizers, electric guitars, etc.), and +4 (dBu) should be used for professional line-level equipment.

Level knob 1 and 2

These controls work together with the Gain switches to set the initial gain of the analog inputs. Turning to the left attenuates the level, and turning to the right boosts the level.

ASSIGNABLE PEDAL/SW 1 and 2 jacks

These are two general-purpose jacks for either a footpedal or footswitch, whose effects are programmable on the FOOT PEDAL ASSIGN page. Available functions are VOLUME, MOD PEDAL, SUSTAIN, PERF ADVANCE, EFFECTS SWITCH, and OFF.

The Wavestation A/D accepts footswitches which are either normally open or normally closed (polarity is set on the FOOT page). KORG Damper Pedal DS-1 or Footswitch PS-2 are suitable.

For control functions, KORG expression pedal EXP-2 is recommended.

3.3 OUTPUTS

MIDI OUT jack

This sends control data such as joystick modulation, Performance selections, and System Exclusive data to external sound modules for controlling another instrument, recording by a sequencer, or interface to a computer librarian/editor.

MIDI THRU jack

This sends out an exact copy of any data received at MIDI IN. This can be used to connect a string of instruments in series, so that they can all be played by a single controller or sequencer.

1L/2R jacks

For normal stereo use, use these phone jack outputs.

The Wavestation A/D's flexible audio output system lets you customize the routing of any Patch to the normal stereo bus outputs 1/2 or the auxiliary outputs 3/4.

3/4 jacks

These auxiliary outputs are usually set up to allow specific Patches to be externally mixed, equalized, or processed. (To learn how to route the outputs, read about the Multi Digital Effects (MDE) processor in Chapter 7).

BALANCED 1L/2R jacks

These duplicate the output of the 1L/2R jacks, with balanced lines for professional applications.

4 BASIC OPERATION

4.1 GENERAL

CAUTION! Do not connect the Wavestation A/D to any equipment that is not switched off! To prevent turn-off transients which can damage speakers, switch off the power amplifier first.

If you have any difficulties when setting up your Wavestation A/D, please refer to the Appendix, Section 11.1, TROUBLESHOOTING.

4.2 PREPARATION

Power

☞ Check that the Wavestation A/D power switch is set to OFF. Only turn this switch back ON after all connections have been made to your power, MIDI, and audio setups.

Volume Settings

☞ Lower the Wavestation A/D MASTER VOLUME knob.

☞ Reduce volume settings on associated mixers and amplifiers.

MIDI Connection

☞ Since the Wavestation A/D has no keyboard of its own, you must play it from an external MIDI controller. To receive MIDI, connect a cable from the controller's MIDI OUT port to the Wavestation A/D's IN port.

☞ If you are working in a sequencing environment, you may wish to use your sequencer's MIDI through function (if it provides one) to route the MIDI out of your master controller through the sequencer and back into the Wavestation A/D. For more information, please see your sequencer's manual.

Note that the effect of MIDI input is subject to the Wavestation A/D's Mode and Channel settings. These are adjusted on the MIDI page.

When shipped, the Wavestation A/D is initially in Omni mode, which means that it receives data on all 16 MIDI channels. This is appropriate for a basic setup with a master controller and a number of "stacked" tone modules.

☞ If you wish to use the Wavestation A/D in a sequencing environment, you will probably want to change the MIDI MODE to either POLY or MULTI. For more information on this and other MIDI operations, please see Chapter 5.

Audio Connection

☞ Connect the Wavestation A/D's audio outputs to your sound system.

For monophonic operation, use jack 1/L only. Stereo playback is highly recommended, if your amplification system allows it.

For stereo, use 1/L and 2/R. If you are connecting the Wavestation A/D to a mixer with balanced inputs, use the Balanced 1/L and 2/R jacks.

You may also listen through headphones, using the PHONES jack on the front panel.

Your audio system is as crucial to your sound as violin or guitar bodies are to those instruments. A weak or distorted sound system can rob the Wavestation A/D of its inherently high fidelity.

Footswitches/Footpedals

☞ Connect any desired footswitches or pedals to the ASSIGNABLE PEDAL/SW 1 and 2 inputs.

To see what the FOOT PEDAL ASSIGN page can do for your foot controllers, please see the Reference Guide.

4.3 POWER-ON

To prevent speaker damage caused by turn-on transients, use the following power-on sequence.

Start-up Instructions

☞ Connect the AC power cord from Wavestation A/D back panel to the specified power outlet.

☞ Switch power on to the Wavestation A/D and other sound-generating devices first. On the Wavestation A/D, the KORG logo appears briefly in the display.

☞ Switch on low-level devices such as mixers and signals processors.

☞ Finally, switch on the power amplifier(s).

☞ For power-off, reverse this sequence (it is not necessary to always disconnect the Wavestation A/D's power cord).

Normal Indications

Normally, after a moment the Wavestation A/D displays the PERFORMANCE SELECT page, which is the "topmost" or main menu:

```
PERFORMANCE SELECT
 Memory Bank: ROM

    49 StationPlatform

 BANK    EDIT    MIDI   GLOBAL   VIEW    TEST
```

The large current Performance number and name actually displayed on your instrument may be different from this example. When you power up the Wavestation A/D, it will remember the Performance that you had selected before last turning it off.

Volume Adjustment

☛ While playing the Wavestation A/D from your controller, gradually turn its MASTER VOLUME knob clockwise (to raise the volume), and then adjust your sound system volume to the desired level.

Pre-Play Check

☛ Check that desired Program and/or PCM Cards are in place.

☛ To prevented undesired modulation, check that the Modulation wheel is fully lowered.

☛ If using a volume pedal, check its initial setting.

☛ Check the footswitch operation(s).

4.4 PERFORMANCE SELECT PAGE

When power is switched on, the Wavestation A/D is ready to play. You see the PERFORMANCE SELECT page:

```
PERFORMANCE SELECT
Memory Bank: ROM


   49  StationPlatform


 BANK    EDIT    MIDI    GLOBAL    VIEW    TEST
```

The PERFORMANCE SELECT page is the "top" page in the Wavestation A/D's menu system. This page allows you to select all of the Performances at your disposal.

It displays the name of the current memory Bank at the top of the screen.

The current Performance is shown in large letters for easy reading at a distance.

☛ To get here from any other page, just press the EXIT switch repeatedly. Since this page is at the top level, you will eventually return here.

4.5 SELECTING BANKS

The current Bank name appears in the upper-left corner of the page.

☛ To select a different memory bank, press BANK.

In other words, press the soft key under the BANK label on the last line of the display. The soft keys are always referred to by their current assignment.

BANK cycles through the bank choices, allowing you to quickly switch between them.

For information on changing Banks from MIDI, see Section 5.8, MIDI BANK SELECT and PROGRAM CHANGE.

4.6   SELECTING PERFORMANCES

☞   Selecting Performances couldn't be simpler: just turn the selector dial, press INC/DEC, or use the keypad.

The dial or INC/DEC access each Performance sequentially (0, 1, 2, . . ., 49).

☞   For random access (34, 17, 42, . . . 5) you can use the keypad. Type in the desired Performance number and press ENTER.

☞   To select Performances from your MIDI controller, you may use MIDI Program Changes. The Wavestation A/D also implements a new feature of the MIDI spec, the Bank Select message (controller #32), which allows you to select from all of the instrument's 200 Performances (250 with a Program Card inserted) . For more information, see Section 5.8, MIDI BANK SELECT and PROGRAM CHANGE.

Whenever you enter numbers from the keypad, you will see the number on the screen immediately, but the Wavestation A/D will not make change until you press ENTER.

Note that 49 is the greatest number you can enter; if you type in a larger value and then press ENTER, it will be changed to 49. This is because all Performances are numbered 49 or less; any greater number is interpreted to mean, "the largest value available." This is true for all values: you can't exceed their limits. If you're ever curious about the maximum value of a particular parameter, you can type in a large number (such as 9999) and press ENTER; the maximum value will be displayed.

If desired, you can program one of the assignable footswitches to advance the Performance number. See the Reference Guide [FOOT PEDAL ASSIGN].

4.7   PLAYING

☞   When auditioning Performances, be sure to try all of the physical modulation controllers available to you on your controller: not just velocity, but aftertouch, the wheels, and the sustain footswitch. You should also try out the Wavestation A/D's joystick, or set up your master controller to act as the joystick (see the Reference Guide [MIDI REMAP]).

☞   To prevent unwanted modulation, periodically check that the MODULATION wheel is fully lowered on your controller.

Polyphony

The Wavestation A/D can play up to 32 notes simultaneously, depending on the current Performance and the polyphony of your master controller.

Aftertouch

The Wavestation A/D responds to both monophonic and polyphonic aftertouch. Monophonic aftertouch affects all voices being played by the current Performance. Polyphonic aftertouch is note-specific, so that each voice responds individually to its own aftertouch amount.

Both types are used as Aftertouch in the Modulation Matrix. It is not necessary to program a patch to respond to one type or another.

Pitch wheel

The Wavestation A/D's response to your master controller's Pitch Bend is determined by its own internal settings. The Global page contains the default Pitch Bend range. Each Patch can also override this with its own range setting.

Modulation wheel

The Wavestation A/D can respond to your controller's MODULATION wheel in a completely programmable manner. The resulting modulation effect may combine vibrato, tremolo, chorusing, panning, reverb, and other expressive effects, as programmed by a variety of Patch and Effects parameters.

4.8 VIEWING PERFORMANCE SETS

The VIEW page lists available Performances in groups of ten. To get to this page, press the VIEW soft key on the PERFORMANCE SELECT page.

```
 VIEW PERFORMANCES
 View Bank: ROM              ROM 49 StationPlatform
 30 Bottled Air              35 Prophet Horn
 31 Rock Stack               36 Mahogany
 32 Excalibur                37 Round Wound
 33 Wave Tables              38 Digi Harp
 34 Bells                    39 Motion Mix
 BANK    00's    10's    20's    30's    40's
```

☛   For the desired set, press the corresponding soft key. The current Performance is shown at the upper right and can be changed.

4.9 USING CARDS

NOTE: When switching off the Wavestation A/D power, check that the memory protect switch *on the card* is switched to on (protect). Otherwise, without the instrument's power, the card's internal battery will drain. If during operation a RAM card's battery goes too low, a warning appears.

All RAM cards must be formatted before being used in the Wavestation A/D. To format a card, enter the UTILITIES page (accessible through the GLOBAL page), insert the card into the slot, and press the FORMAT soft key. Be careful not to format a card with important data on it - formatting will erase all of its data.

The UTILITIES page also allows you to quickly copy to and from Program cards. To back up an entire RAM bank onto an inserted, formatted card, enter RAM 1/2/3 as the From: parameter, and enter CARD as the To: parameter. Select Data to Transfer: ALL, and press the MOVE softkey. To move an entire card bank into RAM, select CARD as the From: parameter, and RAM 1/2/3 as the To: parameter, and then proceed as above.

You can use fresh Program RAM cards just like the internal banks RAM1, RAM2, and RAM3. However, after a while, you will probably create some Performances that combine different types of resources. For example, you might have a CARD Performance that uses a RAM1 Patch, or a RAM2 Patch that uses a CARD Wave. You will have to keep these relationships straight. The blank data sheets

provided at the back of this manual may help. In general, if a Performance calls for a CARD resource which isn't there, it doesn't play that resource.

4.10 GLOBAL SETTINGS

The Global parameters help to adapt the instrument to the playing environment. Thus, it is important to at least be aware of the powers that lurk on the GLOBAL page. In this section we are going to cover Master Tune only. For the other global parameters, please see the Reference Guide.

Paths

Selecting the GLOBAL page provides the first example of the shorthand we will adopt from now on for identifying each page. The *path* describes how to get there using the soft keys. All paths are described beginning from the PERFORMANCE SELECT page. For example:

Path: GLOBAL

tells you that, from the top menu, pressing the GLOBAL soft key selects the GLOBAL page.

```
GLOBAL
Master Tune:          0 cents      Xpose: +24
Effects:                           ENABLE
Memory Protect Internal:           OFF        Card: OFF
Wave Sequence Sync:                INTERNAL
Global Pitch Bend Range:           WHOLETONE
Velocity Response Curve:           5
    UTIL     SCALE     FOOT     ANALOG
```
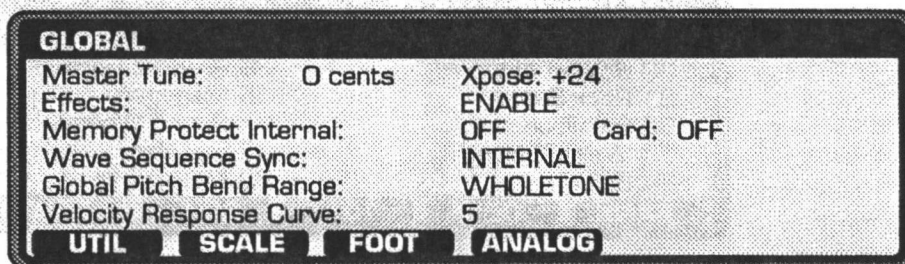
4.11 MASTER TUNE

Found at the top of the GLOBAL page, these parameters raise or lower the basic pitch of the instrument. For example, you may want to fine-tune the Wavestation A/D to a piano, or transpose the keyboard to accommodate a singer's range.

To fine tune the Wavestation A/D:

☞ While playing from your controller, select the Master Tune parameter and adjust the dial to raise or lower the basic pitch.

0 cents is the default setting. 100 cents equals one semitone .

+99 is maximum. In this case the Wavestation A/D is almost a semitone sharp.

-99 is minimum. In this case the Wavestation A/D is almost a semitone flat.

After setting, you should rarely need to adjust this. The Master Tuning adjustment endures even when the power is turned off, because it is stored in battery-backed (*non-volatile*) RAM.

To transpose the entire Wavestation A/D:

☞ Select the Xpose parameter and adjust the dial to the desired transposition. Each number equals one semitone, so that -1 is down a half step, +12 is up an octave, and so on.

Not Enough Tuning Range?

If all Performances are off by the same interval, check that the Xpose parameter is set to 0, or a multiple of 12.

Failing that, the current Performance (or Patches) are probably transposed to an incorrect semitone, or the Pitch Ramp (Under Patch Macros-Pitch) has been set to a high value.

Another, less likely, source of detuning is the interruption of PITCH wheel information -- leaving the instrument "hung" away from A-440 tuning. To clear this problem, make sure all incoming MIDI cables are solidly connected, and adjust the Wavestation A/D back into range by re-centering the external controller's pitch wheel.

If you are using the Analog Inputs in a Patch, it is important to remember that they cannot be tuned by the Wavestation A/D. If you are using another synthesizer as a sound source, for instance, you must adjust the tuning on that instrument itself.

Finally, realize that a Part can be detuned by use of USER Scales, or a Patch can be detuned (accidentally or intentionally) by an oscillator Slope parameter that is not equal to +1.00. The Slope parameter is found on the WAVES page.

---

5 USING MIDI

5.1 GENERAL

The Wavestation A/D's robust MIDI implementation meets modern demands for use as an expressive multi-timbral synthesis module. In MIDI MULTI or MONO modes, the Wavestation A/D can handle 16 channels of MIDI input. Up to 16 multi-timbral setups (Multisets) can be defined, each including 16 Performances and settings for the Multi-Digital Effects (MDE) processor. You can even program an independent channel for effects modulation. This chapter covers the basic points of these MIDI operations.

Other MIDI applications are covered in the Reference Guide (under MIDI RECEIVE, MIDI REMAP, and MULTI-MODE SETUP).

5.2 FACTORY DEFAULTS

When shipped, the Wavestation A/D is set to MIDI Omni mode. This means that it recognizes data received on any of the 16 MIDI channels. So, it is ready to play in a basic set-up with a master controller and several sound modules layered together.

All data, such as the full MIDI note range, preset selections, and wheels, are recognized by default in the factory Performances. Monophonic and polyphonic aftertouch are recognized but may or may not have an obvious effect, depending on the specific Patches which are programmed into the current Performance.

To use the Wavestation A/D in a sequencer environment where it needs to receive on a specific channel, you will need to set it to POLY mode and select the desired channel, as described in Section 5.4 below. To use Wavestation A/D as a multi-timbral sound module, so that it is playing a number of Performances at once, you will need to set it to MULTI mode and create a Multimode Setup, as described in Section 5.11.

In the previous chapter, you may have noticed a Wave Sequence Sync parameter on the GLOBAL page. This feature can be used to synchronize wave sequence steps to MIDI clocks. When this is set to MIDI, each step sounds for the number of MIDI clocks equal to the step's Duration parameter. A step duration of 24, for instance, equals one quarter note; a duration of 12 equals an eighth note; a duration of 6 equals a sixteenth note, and so on.

Figure 5-1 shows the organization of the MIDI menus and their references. For example, from the PERFORMANCE SELECT page, press MIDI to get to the main MIDI page. Then press any of the soft keys shown for their corresponding functions.

Figure 5-1 MIDI Menus
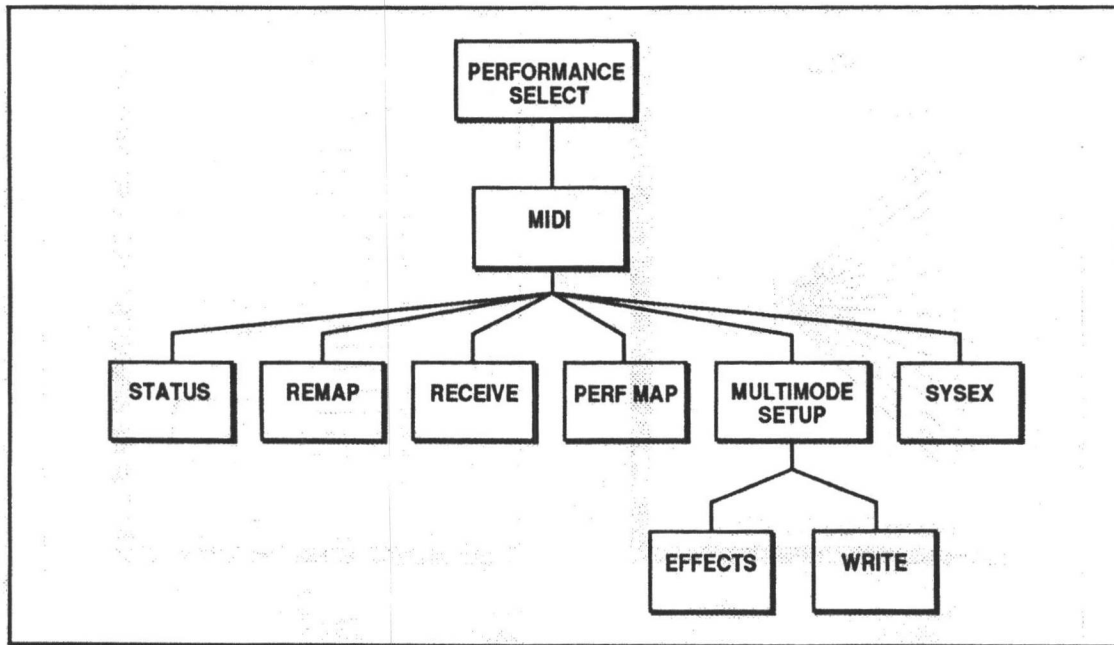
5.3   SELECTING MIDI FUNCTIONS

Path: MIDI

As you can see, this is where the main MIDI functions are set or chosen.

All of the MIDI parameter settings on the MIDI page and its sub-menus are non-volatile, so they remain in the Wavestation A/D even if you turn the power off.

Figure 5-2 shows the Wavestation A/D's 4 different MIDI modes - OMNI, POLY, MULTI, and MONO.

Figure 5-2 MIDI Modes

WAVESTATION A/D MIDI MODES

OMNI

CHANNELS
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

WS

(Mode: OMNI ON, POLY)

POLY

CHANNELS
1
2
3
4
5
6
7
8 — WS
9
10
11
12
13
14 — Other
15
16

(Mode: OMNI OFF, POLY)

MULTI

CHANNELS
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

WS

Perfs

(Mode: OMNI OFF, POLY)

MONO

CHANNELS
1
2
3
4 — Other
5
6
7
8
9
10
11
12
13
14
15
16

WS

(Mode: OMNI OFF, MONO)
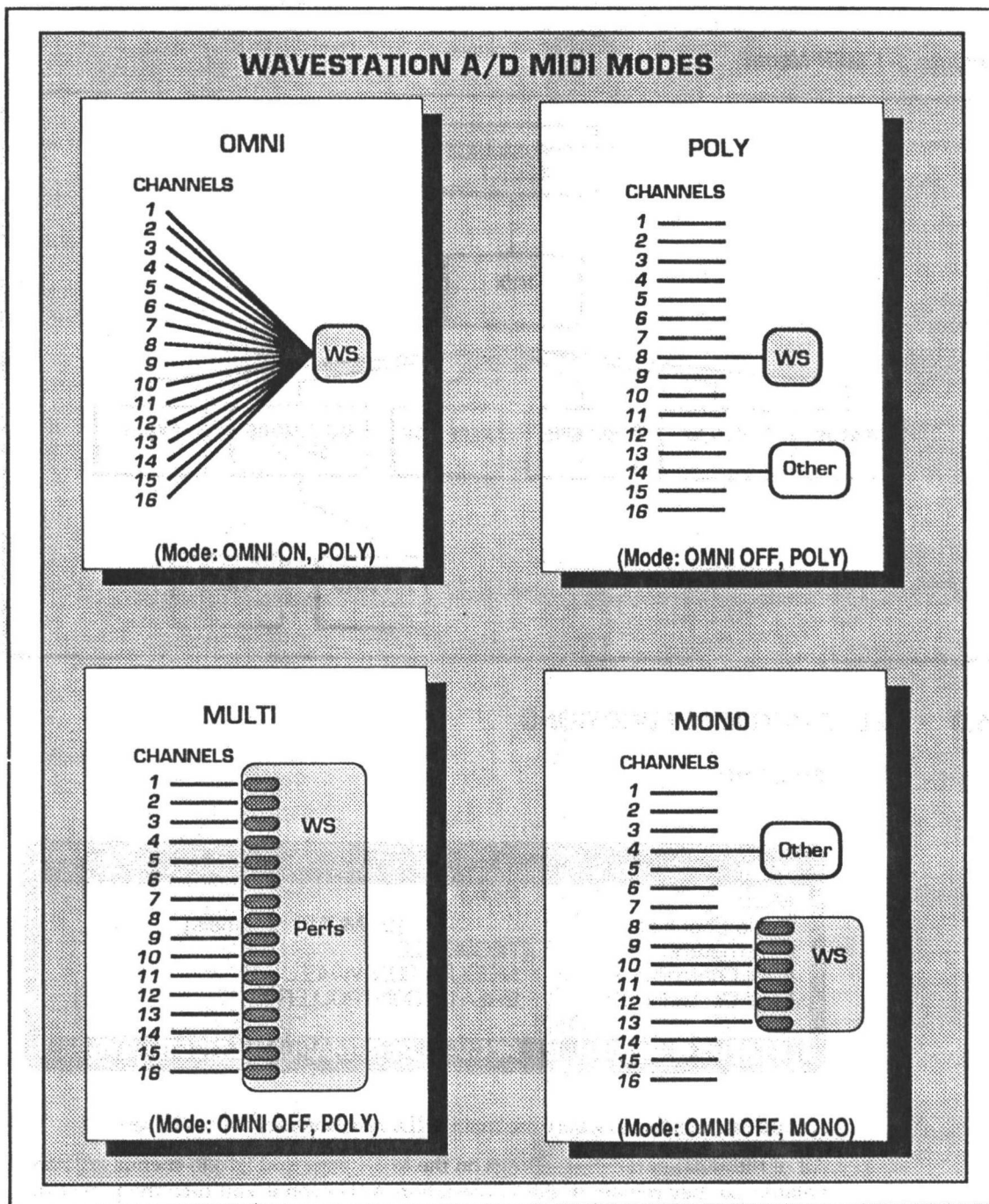
NOTE: In MULTI and MONO modes, local and incoming MIDI controllers are kept separate, so that the sound will not be affected by moving the local joystick unless it is being routed back to the Wavestation A/D via MIDI. In OMNI and POLY modes, local and MIDI controllers are shared.

5.4   SETTING THE MIDI MODE

For your specific setup, you may want to switch the Wavestation A/D to POLY mode so that it responds to only one channel, or you may want to switch to MULTI mode for multi-timbral operation.

☛   Cursor to the first field on the MIDI page, labeled MIDI Mode.

☛   Use the dial to select the desired mode.

OMNI means that the Wavestation A/D receives on all channels.

POLY means that the Wavestation A/D receives on the Basic Channel (as set in Section 5.5 below).

MULTI means that the Wavestation A/D receives on all 16 channels, routing channel data to up to 16 different Performances according to the current Multi Mode Setup. Please see Section 5.11, MULTIMODE SETUPS.

MONO is used most often by guitar controllers. It means that the incoming instrument is spread out over a number of consecutive channels (typically six), to which certain global parameters may apply. The "# MONO CHANNELS" parameter, which only appears in MONO mode, sets the total number of channels to be used. The channels used begin with the current Basic Channel, up to the number of mono channels requested, to the limit of 16. For example, if the Basic channel is set to 1, and the "# MONO Channels" set to 6, then the Wavestation A/D would receive MIDI on channels 1 through 6.

5.5   ADJUSTING THE BASIC CHANNEL

☛   Cursor to the second field on the MIDI page, labeled Basic Channel.

This channel number only has meaning for POLY or MONO mode.

In OMNI mode the channel number is ignored, while in MULTI mode, all channels set to ON (on the Multiset page) respond to MIDI.

5.6   PARAMETERS

The default for this parameter is DISABLE. If you are not specifically using this feature, leave it at that setting to avoid sending unnecessary data.

If this is set to TRANSMIT (or RECOGNIZE & TRANSMIT), the Wavestation A/D will send out MIDI System Exclusive messages whenever any parameter is edited- ENV 1 level one, for instance, or LFO 2 rate. These messages may be recorded by a sequencer and later received by the Wavestation A/D. This allows yet another way to automate real-time timbre changes, such as MIDI-synced filter sweeps. To receive parameter change messages, this must be set to RECOGNIZE or RECOGNIZE & TRANSMIT.

This setting has no effect on Sysex data dumps.

Specific parameter codes are covered in the Reference Guide, under SYSEX Data.

5.7 MIDI CONTROLLER 1 AND 2 ASSIGNMENT

In addition to its normal response to MIDI Controllers, as outlined in the MIDI Implementation Chart at the back of this manual, the Wavestation A/D allows you to assign two additional MIDI Controllers as modulation sources. These appear as MIDI Controller 1 and 2 in the Modulation Matrix, and are set by the parameters of the same name on the MIDI page.

☛   If desired, set these two fields to your favorite MIDI controllers.

The value range is 1 - 95. However, the following complete controller names are used for some numbers:

	OFF (DISABLE)
1	Modulation Wheel or lever
2	Breath Controller
4	Foot Controller
5	Portamento Time
7	Main Volume
8	Balance
10	Pan
11	Expression Controller
12	Effects Controller

While intended for use with continuous controllers (numbered 0 through 63), switch controllers (64 - 95) can also be used. In this case, OFF equals value 0 and ON equals value 127.

64	Damper Pedal
65	Portamento
66	Sostenuto Pedal
67	Soft Pedal
69	Hold 2
91	External Effects
92	Tremolo
93	Chorus
94	Celeste
95	Phaser

NOTE: You can disable recognition of all controllers on the MIDI RECEIVE page. This will include both those controllers recognized by default, and those set as MIDI Controllers 1 and 2.

5.8 MIDI BANK SELECT and PROGRAM CHANGE

The original MIDI Program Change command allowed you to choose between a maximum of 128 programs. Technology has progressed since then, and now the Wavestation A/D can hold up to 250 Performances when a Program Card is inserted - too many for Program Changes alone to handle. By using the newly created Bank Select message in conjunction with Program Changes, you can access each one of the Wavestation A/D's Performances via MIDI.

The Wavestation A/D's five internal Banks are divided into three MIDI Banks, each accessed by a different value of the MIDI Bank Select message (MIDI Controller #32). RAM1 and RAM2 correspond to Controller #32, value 0; ROM and CARD correspond to the same controller, with a value of 1; and RAM3 corresponds to the same controller, with a value of 2.

MIDI Banks 0 and 1 each have 100 Performances, since they are comprised of two internal Banks each; in these, MIDI Program Changes 0-49 select Performances from the first internal Bank (RAM1 or ROM, respectively), and Program Changes 50-99 select Performances from the second (RAM2 or CARD). MIDI Bank 2 contains only one internal Bank, RAM3, and so Program Changes 0-49 call up RAM3 Performances 0-49, respectively.

This means that, unless you are using the Performance Select Map (as discussed in Section 5.10 below), MIDI program changes operate as follows:

MIDI BANK/PROG	Wavestation A/D	Performance
0/0	RAM1	0
. . .	RAM1	. . .
0/49	RAM1	49
0/50	RAM2	0
. . .	RAM2	. . .
0/99	RAM2	49
1/0	ROM	0
. . .	ROM	. . .
1/49	ROM	49
1/50	CARD	0
. . .	CARD	. . .
1/99	CARD	49
2/0	RAM3	0
. . .	RAM3	. . .
2/49	RAM3	49

When a Bank Select message is received, the Wavestation A/D waits until it receives a Program Change message, at which point it changes both the Bank and the Performance number. If a Program Change is received without being preceded by a Bank Select, the Wavestation A/D simply selects that Performance in the current MIDI Bank. Changing banks by using the BANK soft key on the Performance Select page also changes the current MIDI Bank.

If you have used the front panel Bank soft key to select a program in the ROM bank, for instance, MIDI Program Changes alone will only select Performances from the ROM or CARD Banks (MIDI Bank 1). To use a MIDI keyboard or other controller to select a Performance from a different MIDI Bank, you must first send the appropriate Bank Select message (or use the Performance Select Map, as described in Section 5.10 below). The Wavestation A/D itself always sends this message when you change a Performance from the front panel, so if you are recording Program Changes into a sequencer, Bank Selects will happen automatically.

NOTE: The Bank Select message is a MIDI Controller, just like the Mod Wheel or Mod Pedal. If you are using an older sequencer (or other MIDI processor) and filtering out Controllers, Bank Selects will probably be filtered out as well. If Performances are not being changed properly by your MIDI system, make sure that you are not filtering Controllers.

Some older sequencers may also send Bank Select after Program changes, if they are recorded on the same clock. This will cause the Bank Select to be ignored until the next Program Change is received. Manually inserting a Bank Select just before the Program Change will solve this problem.

5.9   MIDI STATUS DISPLAY

Path: MIDI - STATUS

```
MIDI STATUS

                          MIDI Channel Activity
     1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16
     *  *     *     *           *    *   *   *   *   *   *

                                              MULTISET
```

The Wavestation A/D includes a feature that is very handy when you are troubleshooting your MIDI setup. The STATUS page shows graphically when and on what channel data is being received at the MIDI IN jack. When data is received on a particular channel, the asterisk (*) under its number appears. If data is not being received, you know that the problem probably lies in either the MIDI controller or, more likely, a cable or its routing.

This is an expanded version of the front panel MIDI Indicator LED. The primary difference between the two is that this page shows all MIDI activity, regardless of the Wavestation A/D's MIDI settings, while the MIDI Indicator LED only lights for data that the Wavestation A/D will respond to.

For instance, let's say that the Wavestation A/D is set to MIDI POLY Mode, so that it only responds to data on the Basic Channel. If the Basic Channel is set to 1, and the Wavestation A/D receives data on that channel, the MIDI LED will light, and an asterisk (*) will appear under the "1" on the STATUS page. If it receives data on other channels, such as 3 or 15, the STATUS page will show activity on those channels, but the MIDI Indicator LED will not be lit - because the Wavestation A/D is not currently set to respond to those channels.

NOTE: If data is being received, but does not seem to be having any affect on the sound (notes are not playing, for instance, or the pitch wheel doesn't change the pitch) please check the MIDI RECEIVE page to make sure that the Wavestation A/D is set to recognize all desired data. The MIDI RECEIVE page is discussed in the Reference Guide.

The TEST soft key on the PERFORMANCE SELECT page also provides an easy way to test the audio connections to the Wavestation A/D. Pressing this soft key causes the instrument to play a middle C on the currently selected Performance. The soft key's label then changes to STOP, and pressing it again (or pressing any other button, for that matter) will cause the Wavestation A/D to stop playing the note. If this produces any sound, then you know that your audio connections are OK.

For more information, see the Appendix, Section 11.1, TROUBLESHOOTING.

5.10 PERFORMANCE SELECT MAP

Setting up a complex, multi-module setup for a piece of music normally requires sending out separate program changes to each individual module. In a live situation with a single MIDI controller, doing this manually can be impractical; it's much more convenient to be able to select a single program on the controller to set up all of the modules at once. Some MIDI controllers (such as the Wavestation keyboard) can accomplish this by simultaneously sending out different program changes on different channels. If your master controller does not have this capability, however, there are other ways of accomplishing the same thing.

One way to do this is to change the program numbers in each module to match the master controller's program change. Suppose, for instance, that you wanted to send out a MIDI program change 14 to set up a system to play electric piano, acoustic bass, strings, and synth brass. You could juggle around the programs in each module so that the first module's program 14 was electric piano, the second module's program 14 was acoustic bass, the third's program 14 was strings, and so on. Obviously, however, this requires a lot of work to set up and maintain, and probably also entails copying the same patch to a number of different program locations (you'll be using that electric piano in more than one song).

A more elegant method is to leave the programs in their original locations, and instead map incoming MIDI program changes to select different program numbers. For instance, that electric piano might be the module's ROM Performance 26, but would be set to be called up by MIDI Program Change 14. You might even map a number of different MIDI Program Changes - say, 14, 56, and 97 - to all call up that same electric piano.

The Performance Select Map allows you to do just this. All 127 possible MIDI Program Change commands may be mapped to any of the Wavestation A/D's 200 Performances (250, if a ROM or RAM Card is inserted).

For example, you can easily construct a map that does this:

Received MIDI Prog Change#	Bank	Performance
0	CARD	49 ULTIMO
1	RAM1	0 Ski Jam
2	RAM1	0 Ski Jam
3	ROM	34 Bells
. . .		
127	ROM	30 Bottled Air

This also makes it easy to select programs from different banks, even if your controller doesn't send MIDI Bank Select.

Accessing the Performance Select Map

Path: MIDI - PERFMAP

```
┌─────────────────────────────────────────────────────────────┐
│ PERFORMANCE SELECT MAP                                        │
│ Performance Select Map:        DISABLED                    ↓  │
│ Program Change#────→ Performance                             │
│      0                  CARD   0   MY PIANO STUFF            │
│      1                  RAM1  25   YOUR STUFF                │
│      2                  RAM2  49   DOLPHIN DUET              │
│      3                  ROM   32   STEEL DRUMS               │
│  STATUS                                          MULTISET    │
└─────────────────────────────────────────────────────────────┘
```

Performance Select Map

This parameter switches the Performance Select Map on and off.

DISABLED is the default. This means that the map is not used, so Performances are selected as explained under Section 5.8, MIDI BANK SELECT and PROGRAM CHANGE.

ENABLE means that the custom map is used.

Editing the Performance Select Map

☞ Scroll down the list to select the line of the desired MIDI program change number.

☞ Cursor across to select the desired BANK (ROM, RAM1, RAM2, RAM3, or CARD).

☞ Cursor right one more field to select the desired Performance within the bank.

5.11 MULTIMODE SETUPS

The Wavestation A/D is designed to function elegantly as a multi-timbral sound module in a sequencing environment. The Multimode Setup page allows you to create groups of up to 16 Performances, one per MIDI channel, each of which can be played simultaneously. There are 16 such groups, called Multisets.

Normally, each Performance has its own Effects programming. However, in MULTIMODE you can have 16 Performances -- but you can't have 32 effects! So, the Wavestation A/D ignores all of its Performance Effect programming, and instead each of 16 Multimode Setups (Multisets) has its own Effects assignments. These have exactly the same power as the Performance Effects.

The Multimode Setup serves to select an initial set of Performances and Effects settings. These setups allow you to try various sound combinations without having to specifically program those selections from a sequencer. Although it is possible to send and receive Multimode Setup changes, this is not always necessary - because each channel of a Multimode Setup responds to MIDI Program Changes *independently*. This means that, in MULTI and MONO modes, the Wavestation A/D functions as up to 16 discrete synthesizers.

In addition to use in sequencing, the Multisets also make it easy to create multi-timbral programs for alternate controllers, such as MIDI guitars.

Path: **MIDI - MULTISET**

```
┌─────────────────────────────────────────────────────────────┐
│ MULTIMODE SETUP                    [MULTISET is EDITED]      │
│ Multimode Setup: 15        FX Control Chan: 4              ▼ │
│ MIDI      CH      Level     Performance:                    │
│   1       ON       127      ROM      16 Modernesque         │
│   2       ON       105      CARD     13 Trombone            │
│   3       ON       127      ROM      31 Rock Stack          │
│   4       OFF       55      RAM1      0  Ski Jam            │
│ [ STATUS ] [ XMIT ] [ EFFECTS ] [ PERFMAP ] [ REMAP ] [ WRITE ] │
└─────────────────────────────────────────────────────────────┘
```

To use the Multimode Setups:

☞   Change the Mode parameter on the MIDI page to MULTI (or MONO, for use with alternate controllers such as MIDI guitars).

☞   Go to the MULTIMODE SETUPS page.

☞   Select the Performance desired for each MIDI channel by cursoring to the Bank and Performance number fields, and using the dial, keypad, or Inc/Dec. This can be changed by MIDI Program Change messages.

☞   Set the level desired for each Performance. Changing this value sends out MIDI Volume messages (Controller #7) on that channel; this value also responds to MIDI Volume messages received on that channel.

☞   Select the desired effects, by pressing the EFFECTS softkey.

☞   Play the Multiset from your sequencer or controller.

The current Multimode Setup may be changed by cursoring to that field and using the dial, keypad, or Inc/Dec.

For more information, please see the Reference Guide [MULTIMODE SETUP].

6   PERFORMANCE TOUR

6.1   OVERVIEW OF EDITING

Chapters 6 through 10 tour across the Wavestation A/D's editing system, showing you where to make some of the most important and useful custom settings. The goal is to start you making real, useful edits as quickly as possible. Therefore, we will concentrate on the "how," and not the "why," of each operation.

Figure 6-1 is a map of the Wavestation A/D's *architecture*, along with references to corresponding sections in the remainder of this manual.

Figure 6-1 Wavestation A/D Performance Signal Flow
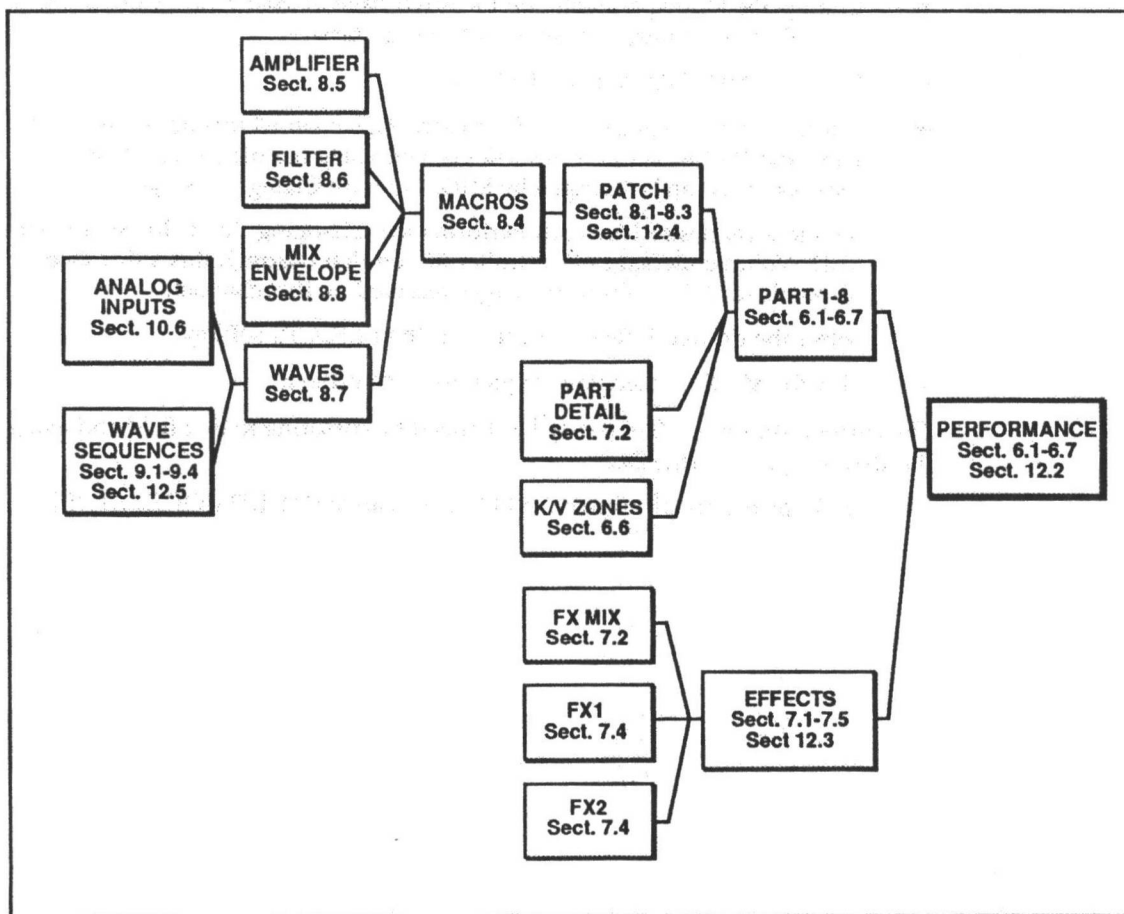
If you were to create a new sound by strictly following signal flow, you would start with an initialized Patch, setting the oscillator structure and sync mode, picking waves or wave sequences, and applying vector synthesis. Then you might set up Macros for the voice amp, filter, pitch and pan, possibly touching up the details for individual waves or modules. After building or editing up to eight such Patches, you would assign them to newly initialized Parts of a Performance, set their key and velocity zones and other playback details. As a final touch, you

would probably pick an effects configuration and assign the Parts to the Multi Digital Effects (MDE) processor. You might even use the MDE to route patches to the auxiliary output jacks.

To program the Wavestation A/D you need to be aware of this signal flow. However, while *learning* to program, it is probably easier to reverse that order: start with Performances and work backwards in signal flow, or *down* the menu structure. This is the approach we'll take in these tours.

6.2 OVERVIEW OF PERFORMANCES

Figure 6-2 shows how the Performance menus are organized. Use this and the following tree charts to keep your bearings throughout the tours. (By referring to the Path descriptions, you can easily find your way around.)

Figure 6-2 Performance Menus
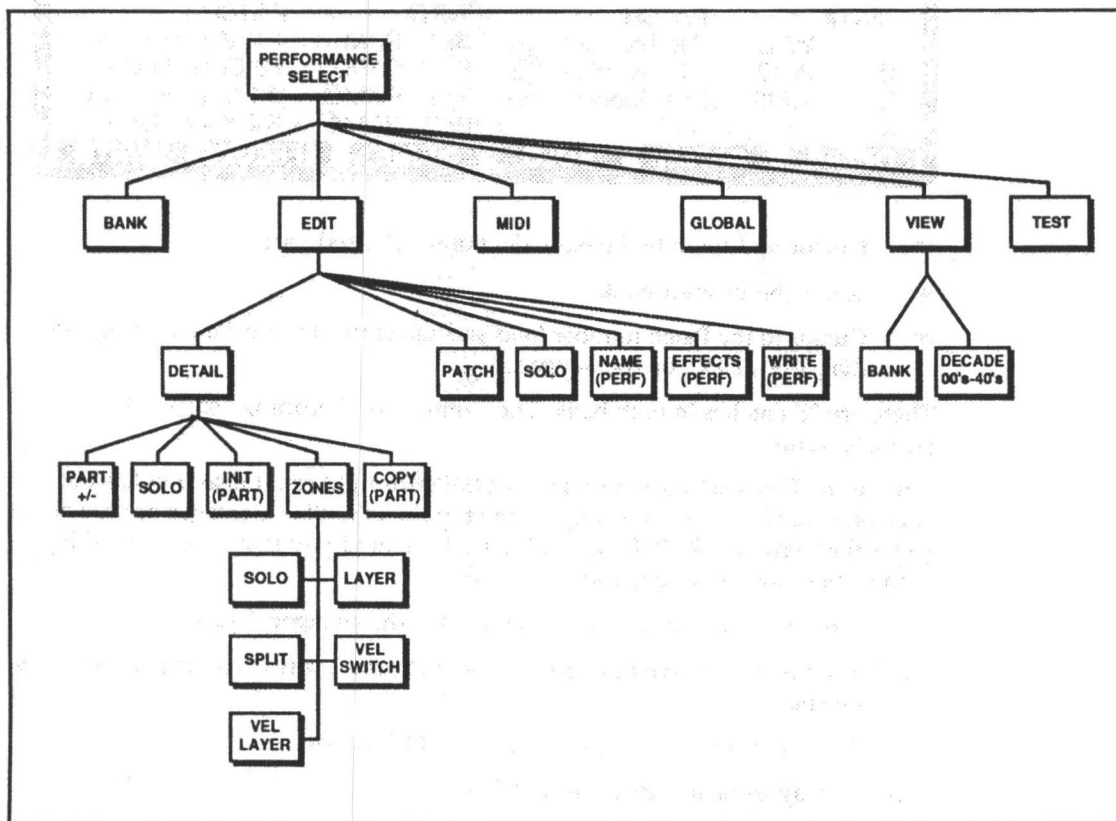
Memory Protection

NOTE: To preserve the factory sounds and tour with peace of mind, check that Memory Protect Internal (on the GLOBAL page) is on. Before disabling protection, it may be a good idea to backup the factory sounds either to a RAM card, or via MIDI System Exclusive dump.

6.3 ASSIGNING PATCHES TO PARTS

Recall from the overview that Performances have Parts, which contain Patches that play according to certain Part Details and Zone Settings.

So, one of the first things to try to do to a Performance is to select different Patches for its eight Parts. You can easily change the Patches assigned to each Part on this page. (On this page, Patch names are abbreviated.)

Editing the Parts couldn't be simpler.

☞ First, select the EDIT PERFORMANCE page.

Path: EDIT

```
EDIT PERFORMANCE                    [PERFORMANCE is EDITED]
Performance: CARD 12 GIGSET 1
PART#          PATCH          PART#          PATCH
 1:   CARD    12 Trumpet       5:   ROM     22 Waterphone
 2:   CARD    13 Trombone      6:   CARD    13 Shakuhachi
 3:   RAM2    11 Soprano Sax   7:   RAM2    11 Soprano Sax
 4:           --               8:   RAM1    34 Yore Guess
  DETAIL    PATCH    SOLO    NAME    EFFECTS    WRITE
```

☞ Cursor up/down to the Bank field of the desired Part.

☞ Select the desired bank.

☞ Cursor to the Patch number field and select the desired Patch, using the dial, INC/DEC, or the keypad.

There are 35 Patches in each bank. The symbol "--" (meaning "empty") is also a possible value.

Editing the Patch selection turns the COMPARE light on. It also invokes the "Performance is edited" warning on the top line. (Similar messages appear on all pages that have a WRITE function. This is to remind you that you are working with something you might want to save.)

☞ Play the new Performance, listening for the changed Patch.

If a Performance is heavily layered and you choose a soft Patch, the change may not be obvious.

☞ To hear this Part by itself, try the SOLO function.

This is a way to hear individual Patches.

6.4 SAVING A PERFORMANCE

Try to save everything that sounds good or would take a lot of work to rebuild. RAM Cards make this easy. You can also save to RAM1, RAM2, or RAM3, or use the SYSEX DATA TRANSMIT page to record the data with a MIDI sequencer, data disk, or librarian program. For more information on Sysex, see the Reference Guide [SYSEX DATA TRANSMIT].

NOTE: Before attempting to write to a RAM card, disable its protection switch. After a writing session, re-enable the Protection switch to prevent battery drain when power is switched off.

☞ On the EDIT PERFORMANCE page (shown above), press WRITE.

☞ On the WRITE page, select the target destination Bank and Number for the edited Performance.

Path: EDIT - WRITE

```
┌─────────────────────────────────────────────────────────┐
│ WRITE                          PERFORMANCE is EDITED      │
│ Data Type:    PERFORMANCE                                 │
│ Source:       RAM2  40 CHOIR, FEMALE                     │
│ Destination:  RAM2  40 CHOIR, FEMALE                     │
│                                                          │
│ Memory Protect Internal: ON    Card: ON                  │
│ Currently playing: SOURCE                                │
│ [EXECUTE]                      [NAME]                     │
└─────────────────────────────────────────────────────────┘
```

☞ To hear the destination, change the "Currently Playing" field to DESTINATION.

☞ To write the changes into memory, press EXECUTE.

Memory Protect must be OFF for the memory bank (Internal or Card) into which you are writing.

6.5   EDITING PART DETAILS

Path: EDIT - DETAIL

```
┌─────────────────────────────────────────────────────────┐
│ PERFORMANCE PART DETAIL                                   │
│ Part:  1      Patch: RAM2  49 CHOIR, FEMALE              │
│ Level: 99                      FX Bus: 50/50             │
│ Xpose: 0                       Detune: 0                 │
│ Delay: 1024                    Sustain: ENABLED          │
│ Play Mode: LOCAL               Scale: PURE MAJOR  C      │
│ Mode: POLYPHONIC               [Key Priority: High]      │
│ [ PART - ] [ PART + ] [ SOLO ] [ INIT ] [ ZONES ] [ COPY ] │
└─────────────────────────────────────────────────────────┘
```

This page shows the details of each Performance Part. At the top of the page is the most important parameter: the name of the Patch assigned to this Part.

☞ Select the number of the Part to be edited (in the first field on the page). Use PART - and PART+ to decrement/increment.

FX Bus is also important: it routes the Patch to the MDE. You'll learn more about this in the next chapter.

The Level parameter allows you to adjust the relative volume of each Part.

The Xpose parameter works much like the one on the GLOBAL page, with the value equal to the transposition in semitones (+1 is up a half step, -12 is down an octave, etc.). This can be very useful when stacking two Patches with different ranges, or in achieving automatic parallel intervals.

Other Parameters

For more information on Part parameters, please see following sections in the Reference Guide: PERFORMANCE PART DETAILS, KEY AND VELOCITY ZONES, and MIDI RECEIVE.

6.6   CHANGING KEYBOARD ZONES

Path: EDIT - DETAIL - ZONE
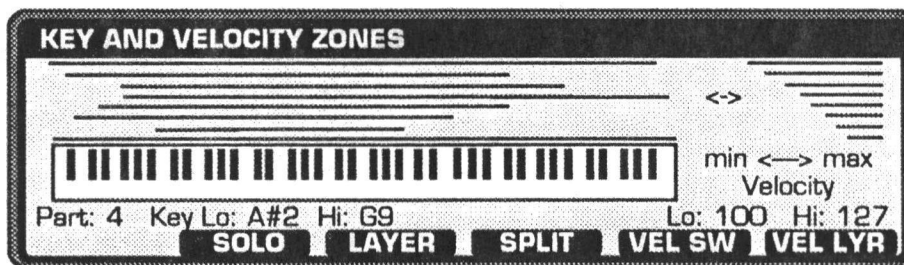
The KEY AND VELOCITY ZONES page graphically displays the keyboard layers and splits, as well as velocity ranges programmed into the Performance. In general, Patches create sound and can be thought of as instruments, while the Zones and Details determine how the eight instruments play together.

Automatic Zoning

☞   To automatically distribute the current Parts over the keyboard or velocity range, select the desired keyboard mode (LAYER, SPLIT, VEL SW, VEL LYR).

The automatic zoning feature quickly sets up the basic keyboard mode with appropriate defaults for each non-empty Part. (For zoning to work, there must be more than one non-empty part.) From this initial setup you are free to customize the zoning.

For example, if there are five Parts with Patches assigned to them, pressing LAYER would form them into a five-layer stack .

SPLIT would assign the Parts consecutively to five ranges across the keyboard. Part 1 would be the lowest range, and Part 5 the highest.

VEL SW would assign discrete fifths of the velocity range to each part. For example, there are 127 MIDI attack velocity values (0 = Note Off). This amounts to approximately 25 velocity steps per part. Part 1 would sound from 1-25, Part 2 from 26-50, and so on. When there are only 2 active Parts, the switch point defaults to 100.

VEL LYR is similar to VEL SW, except that instead of forming discrete velocity zones, the zones overlap. As shown in the display page above, all Parts are set to a maximum velocity of 127, but each Part is assigned an increasingly higher minimum velocity. Part 1 would be played from the entire velocity range, Part 2 from 26-127, Part 3 from 51-127, and so on. This allows you to quickly set a basic timbre (such as a pad) to always sound, with other timbres (such as attack transients) being added to the basic sound when the keyboard is played harder. The harder you play, the more layers are heard.

Manual Zoning

☛ To establish the basic characteristics of the ZONE, first use automatic zoning. (Press LAYER, SPLIT, VEL SW, or VEL LYR.)

☛ To select any Part for specific editing, adjust the Part number using the Up/Down cursors.

The double arrow moves to the corresponding display line.

☛ Select the desired zone parameter by cursoring left/right.

☛ Enter desired key and velocity limits using the dial, INC/DEC, or keypad. Key and velocity limits may also be entered over MIDI from your master controller by playing the desired keys and velocities.

6.7 INITIALIZING A PART

After experimenting with existing Parts, you may want to start from scratch. To clear a Part and set all its parameters to their defaults:

☛ On the PERFORMANCE PART DETAIL page, press INIT (for initialize).

☛ You will be given a warning (ARE YOU SURE?), after which you can press YES.

☛ Repeat this for undesired Parts in the Performance.

7 EFFECTS TOUR

### 7.1 OVERVIEW OF THE EFFECTS SYSTEM

The Wavestation A/D includes a self-contained Multi Digital Effects (MDE) processor. This module has two important functions. First, it provides two independent and identical processors, called EFFECT 1 and EFFECT 2 (or, FX1 and FX2). Each of these run one of 55 different effects programs (such as reverb, delay, distortion, and so on).

Second, the MDE programs all the routing associated with the effects. This includes the configuration of FX1 and FX2 (series or parallel), the routing of Parts through or bypassing FX1 and FX2, and the mixing and assignment of Parts and Effects outputs to the four back-panel audio jacks.

There are two levels of Effects editing, although both occur within the Performance (or Multiset - see below). The higher level is where you choose either parallel or series processing, and where you select one of the effects programs for FX1 and FX2. These adjustments are covered in the next few sections.

The lower level of Effects editing involves adjusting the specific parameters for each of the effects programs. As you select different programs, you'll find that the parameters vary according to the program type. For explanations of each type of effects program, please see the Reference Guide [EDIT EFFECT 1 (2)].
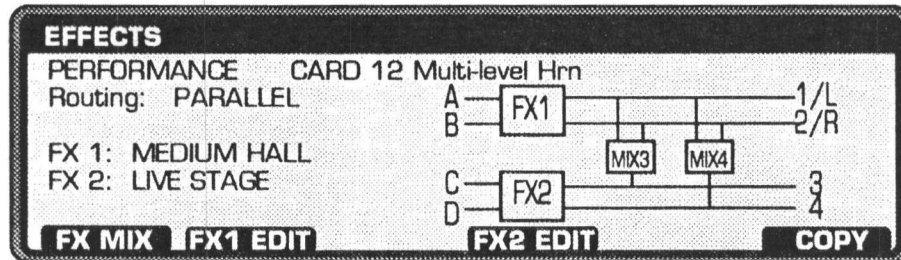
Figure 7-1 Effects Menus
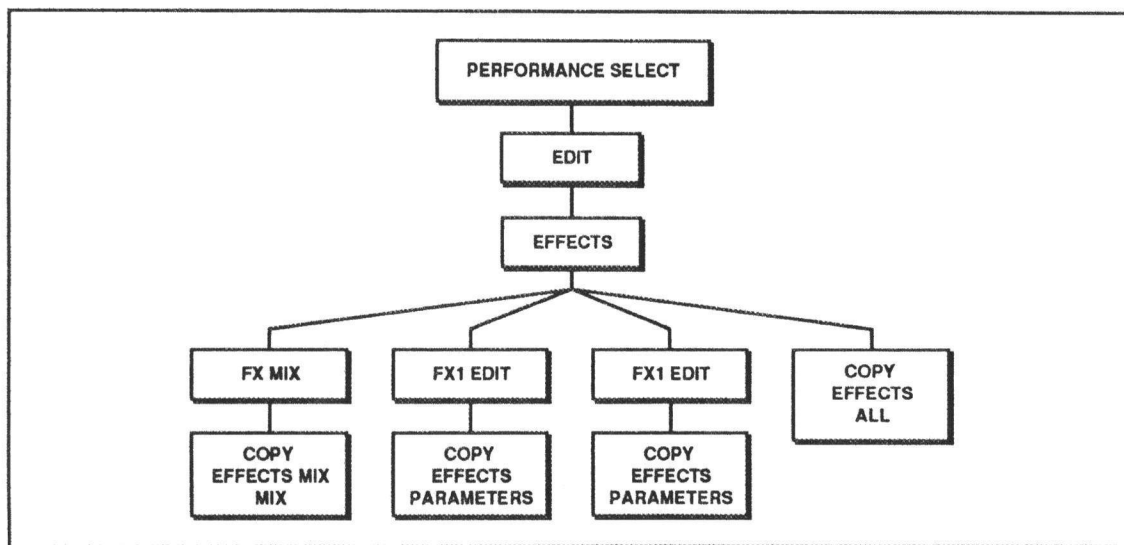
Normally, each Performance has its own pair of effects. In MULTI mode, you can use up to 16 Performances simultaneously - but you can't have 32 separate effects! Because of this, MULTI MODE Setups have their own separate effects settings which override the effects of the individual Performances.

7.2 EFFECTS BUSES AND ROUTING

Path: EDIT - EFFECTS

To make sure that your Parts receive the desired processing and appear at the correct output jacks, you have to know a little bit about how the MDE works.

The MDE has four inputs (A - D) arranged as two buses. You route Patches to these inputs by using the FXBus parameter, as discussed below in Section 7.3.

There are four outputs (1 - 4), which correspond to the back-panel jacks. The relationship between the inputs, the FX1 and FX2 processors, and back-panel outputs is controlled on the EDIT EFFECTS page by the Routing parameter. This sets the effects processing to either Parallel or Series mode.

Parallel Routing

The parallel mode allows separate processing for the A/B and C/D inputs. See Figure 7-2.

Figure 7-2 Parallel Routing
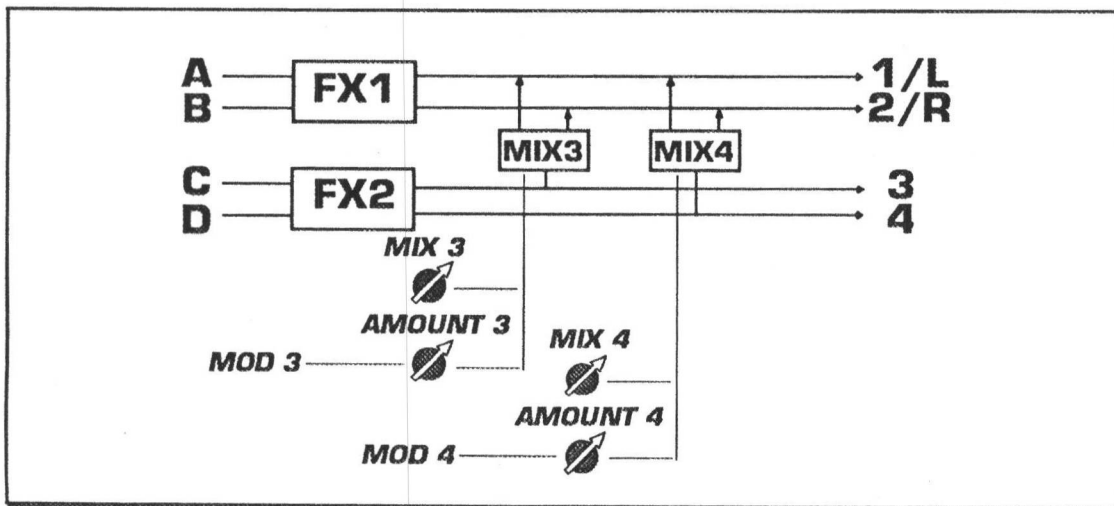
In Parallel routing, the panned input at A/B goes through FX1 to output 1/2. Input C/D goes through FX2 to output 3/4. Also, FX2 can be mixed into the 1/2 output through MIX3 and MIX4. This gives you dynamic control over the panning.

Series Routing

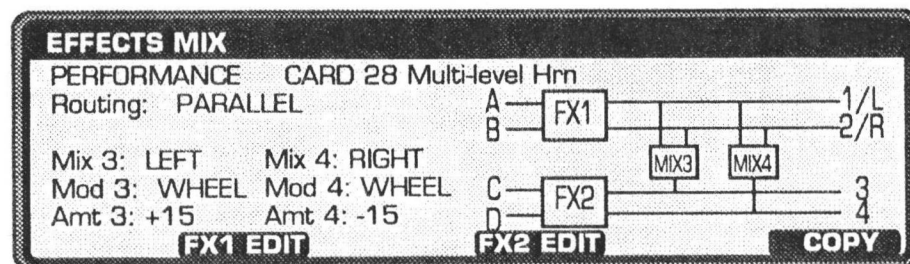The series mode makes "multi-effects" processing possible for input A/B. See Figure 7-3.

Figure 7-3 Series Routing
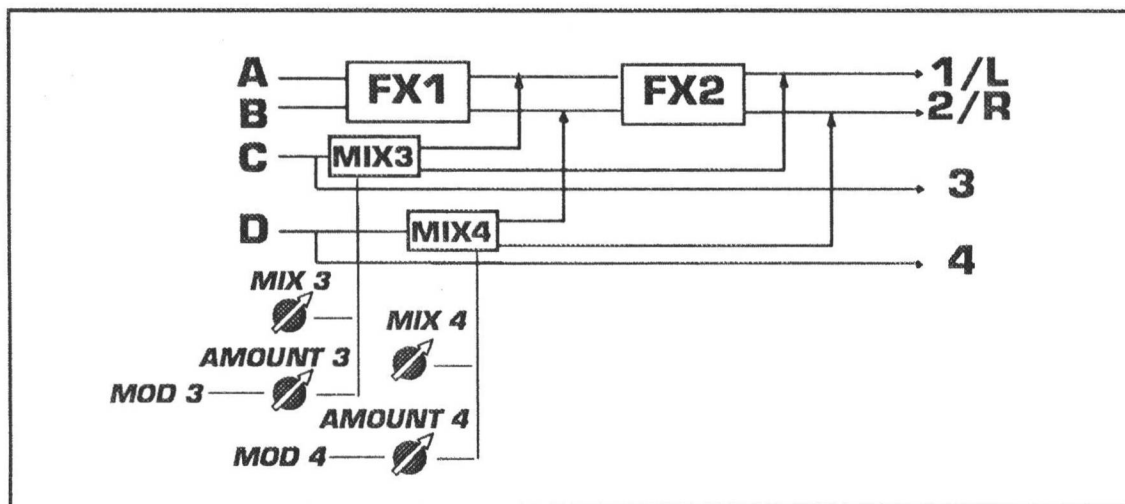
Input at A/B goes through FX1 and FX2 to output 1/2. Inputs C/D are left unprocessed at the outputs 3/4, or can be dynamically mixed (wet/dry) into FX2 as well.

FX Mix

Path: EDIT - EFFECTS - FX MIX

Mix 3/4

Both configurations include Mix 3/4 parameters. The configuration diagrams show how the mixture function changes with the configuration. In parallel mode, Mix 3/4 controls the left/right placement of FX2. In series mode, Mix 3/4 controls the FX2 Wet/Dry mix for buses C and D.

When the Stereo Vocoders are used, the Effects Mix works in a slightly different way; for more information, see the description of the Stere Vocoder-Delay effects in the Reference Guide, or see Section 10.7 of this Player's Guide.

Mod 3/4

In addition to the modulation possibilities available through the effects themselves, the Mod parameter allows you to achieve dynamic control over the effects mix , especially when using the series configuration. For example, you can easily control reverb or flanging depth from a footpedal. Mod3 and Mod4 allow you to pick a controller for varying the initial levels set by Mix3 and Mix4.

SYMBOL	Modulation Source
NONE	No modulation
WHEEL	Mod wheel
AT	Channel aftertouch
VEL	Last Note-On velocity (Not gated by Note-Off)
KEY	Highest key number; if none down, then last key
ENV	Summed amplitude envelopes of all buses
KEYDN	Key down gate
FSW	Footswitch momentary, push-on/release-off | (On FOOT PEDAL ASSIGN, |
FSWTOG	Footswitch toggle, push-on/push-off | set to EFFECTS SWITCH) |
PEDAL	Footpedal (On FOOT PEDAL ASSIGN, set to MOD PEDAL)
MIDI 1	MIDI Controller 1
MIDI 2	MIDI Controller 2
WH+AT	Sum of mod wheel and aftertouch
JOY-X	Horizontal axis Joystick controller
JOY-Y	Vertical axis Joystick controller

Amount 3/4

This is the depth of the effect produced by the modulator selected under Mod 3/4. A positive amount moves the mix from left to right or dry to wet. A negative amount moves the mix from right to left or wet to dry.

7.3   ROUTING PATCHES INTO THE MDE

Path: EDIT - DETAIL

```
╔══════════════════════════════════════════════════╗
║ PERFORMANCE PART DETAIL                           ║
║ Part:  1      Patch: RAM2  49 CHOIR, FEMALE       ║
║ Level: 99                   FX Bus: 50/50         ║
║ Xpose: 0                    Detune: 0             ║
║ Delay: 1024                 Sustain: ENABLED      ║
║ Play Mode: LOCAL            Scale: PURE MAJOR  C  ║
║ Mode: POLYPHONIC            [Key Priority: High]  ║
║ [ PART - ][ PART + ][ SOLO ][ INIT ][ ZONES ][ COPY ] ║
╚══════════════════════════════════════════════════╝
```

You assign Performance Parts to the MDE input buses on the PERFORMANCE PART DETAILS page.

☞ In the FX Bus field, select the desired bus assignment. The options and their meanings are:

BUS-A   Bus A only
99/1 - 1/99 Panned to A/B
BUS-B   Bus B only
BUS-C   Bus C only
C+D   Centered to C/D
BUS-D   Bus D only
ALL   All four buses
PATCH   Bus selected at Patch level, on the Patch Bus Assignment page

7.4   EFFECTS EDITING

Path: EDIT - EFFECTS - FX1 EDIT (or FX2 EDIT)

```
EDIT EFFECT 1 (2)                        LARGE HALL - EQ
Dry/Wet Mix: 50/50      Src: WHEEL    Amt: -11
Pre Delay:   100 mSec
Decay Time:  70
E/R Level:   5
HF Damping:  40
Low EQ:      0 dB       High EQ: 0 dB
 FX MIX                    FX2 EDIT            COPY
```

This example just shows one of the 55 effects you might see here. Each effect contains a number of parameters that can be accessed and adjusted.

For details on specific effects parameters, please refer to the Reference Guide.

7.5   SELECTING PERFORMANCE EFFECTS

Having learned about the effects system, you can now choose the desired configuration and try different effects by dialing the Effect 1 or Effect 2 fields. Not all effects sound good with all sounds, and both may benefit from careful editing. For example, to discourage muddiness as you increase the reverb depth, you may want to shorten some envelope times in the Patch.

A descriptive list of the effects choices follows.

7.6   EFFECTS LIST

00 No Effect

REVERB - EQ

01 Small hall reverb - EQ
The tight, well-defined reverberation patterns of a light, spatial hall.

02 Medium hall reverb - EQ
Short and emphasized early reflections characteristic of a warm, spatial hall.

03 Large hall reverb - EQ

The natural, spacious and dense ambience characteristic of a concert hall.

04 Small room reverb - EQ

A light, tight room good for thickening.

05 Large room reverb - EQ

A warm, tight room.

06 Live stage - EQ

A dense, tight room.

07 Wet plate reverb - EQ

A dense, open plate.

08 Dry plate reverb - EQ

A light, open plate.

09 Spring reverb - EQ

Resonant springs.

EARLY REFLECTIONS

Reverberation is created out of both the reverberant "wash" and more discrete, initial echoes called early reflections. The hall, room, plate, and spring reverbs listed above contain both of these elements, but the three effects below create only the early reflections, allowing you to adjust these parameters with greater precision.

Adjustment of the Decay Time permits a wide range of effects, such as adding density to the sound or achieving a "live" room sound. Following an Early Reflections program with reverb (in series Routing), gives especially high-quality reverberation.

10 Early reflections - EQ 1

Dense early reflections .

11 Early reflections - EQ 2

Modulated early reflections .

12 Early reflections - EQ 3

This effect uses a reverse envelope on the early reflections.

GATED REVERB - EQ

In these effects an early reflections reverb is gated by a modulation source. The gate hold time is adjustable.

13 Forward gated reverb - EQ

14 Reverse gated reverb - EQ

STEREO DELAY

15 Stereo delay

A stereo delay effect having two delay systems, where the delay times are synchronized to fixed ratios of each other. For swell-in/out delay effects, you can modulate the input level.

16 Ping-pong delay

A stereo delay in which the feedback signal of each delay crosses over to the other so that the delayed sound alternates left-right.

DUAL MONO DELAY

17 Dual mono delay

Two separate, parallel delays.

MULTI - TAP DELAY - EQ

18 Multi-tap delay - EQ 1

Two multi-repeat, parallel delays with input modulation.

19 Multi-tap delay - EQ 2

Two multi-repeat, parallel delays with cross panning and input modulation.

20 Multi-tap delay - EQ 3

Two multi-repeat, parallel delays with crossover feedback and input modulation.

STEREO CHORUS - EQ

21 Stereo chorus - EQ

A stereo effect that combines two parallel chorus circuits using phase-inverted LFOs.

22 Quadrature chorus - EQ

Two parallel chorus circuits using quadrature-phased LFOs.

23 Crossover chorus - EQ

Two parallel chorus circuits using quadrature-phased LFOs and crossover output mixture.

HARMONIC CHORUS

24 Harmonic chorus

This stereo chorus features quadrature-phased LFOs and a special frequency splitter. The splitter routes high frequencies to the chorus. Low frequencies are routed around the effect, and thus excluded from processing.

STEREO FLANGER - EQ

25 Stereo flanger - EQ 1

A stereo effect combining two flanger circuits, with phase-synchronous LFOs.

26 Stereo flanger - EQ 2

A stereo effect combining two flanger circuits, with phase-inverted LFOs.

27 Crossover flanger - EQ

A flanger effect in which the feedback signal of each flanger circuit crosses over and is routed to the other flanger.

Crossover flanger uses phase-synchronous LFOs.

ENHANCER - EXCITER - EQ

28 Enhancer - exciter - EQ

A stereo exciter with spatial delays.

DISTORTION - FILTER - EQ

29 Distortion - filter - EQ

This effect has a "dirty" sound and "wah" effect. It is effective for solos.

30 Overdrive - filter - EQ

This is an effect that simulates the overdrive generally used by guitars.

STEREO PHASER

31 Stereo phaser 1

Phaser 1 uses phase-synchronous LFOs.

32 Stereo phaser 2

Phaser 2 uses phase-inverted LFOs.

ROTARY SPEAKER

33 Rotary speaker

The "speaker" is modulated by a free running LFO. The slow and fast speed switch is chosen by the acceleration mod source. Continuous controllers are filtered by the acceleration amount. In other words, if the controller is moved suddenly, the acceleration rate determines how long it takes the rotors to reach their new speed.

The footswitch can be set to turn the effect on or off, or it can be used to control the mode of the fast/slow rotor speed select (by selecting the footswitch as the rotor speed mod source).

STEREO MOD - PAN - EQ

These effects dynamically pan the inputs in the stereo output mix. The effect output is the mix between the panned outputs and the equalized effect inputs.

34 Stereo mod - pan - EQ

Two parallel dynamic pan effects with phase-synchronous LFOs.

35 Quadrature mod - pan - EQ

Two parallel dynamic pan effects with quadrature-phased LFOs.

EQUALIZATION

36 Stereo parametric equalizer

This is a three-band parametric equalizer. For "wah" type effects, you can modulate the midrange frequency.

STEREO COMBINATION MODULATED/FIXED DELAY - EQ

In these effects, a mono-in/stereo-out chorus or flanger drives a stereo delay line which includes a sample/hold feature for capturing and recirculating the delay line contents.

37 Chorus - stereo delay - EQ

This is a mono input, stereo output chorus fed into a stereo delay with sample/hold.

38 Flanger -stereo delay - EQ

This is a mono input, stereo output flanger fed into a stereo delay with sample/hold.

DUAL MONO DELAY - REVERB

39 Delay/hall

A monophonic delay in parallel with a monophonic hall reverb.

40 Delay/room

A monophonic delay in parallel with a monophonic room reverb.

DUAL MONO FIXED/MOD DELAY

41 Delay/chorus

A monophonic delay in parallel with a monophonic chorus.

42 Delay/flanger

A monophonic delay in parallel with a monophonic flanger.

DUAL MONO DELAY - OVERDRIVE - DISTORTION

43 Delay/distortion-filter

A monophonic delay in parallel with a distorted "wah" effect.

44 Delay/overdrive-filter

A monophonic delay in parallel with an overdrive "wah" effect.

DUAL MONO DELAY - PHASER

45 Delay/phaser

A monophonic delay in parallel with a monophonic phaser.

DUAL MONO DELAY - ROTARY

46 Delay/rotary

A monophonic delay in parallel with a monophonic rotary speaker simulator.

STEREO PITCH SHIFTER

47 Stereo Pitch Shifter

A stereo pitch shifter with the left channel shifted up and the right channel shifted down. This effect makes an excellent stereo chorus when used with small amounts of shift.

48 Mod Pitch Shift - Dly

This pitch shifter allows the amount of shift to be modulated. The input may be shifted either up or down, and the shifted signal may also be delayed with respect to the original signal, with an adjustable feedback amount.

This effect allows the Wavestation to control the pitch of the Analog Inputs. Some applications of this include "whammy-bar" pitch bending and special effects, such as transposing speech down to make it sound ominous, or up to create a humorous "helium voice."

STEREO COMPRESSOR-LIMITER/GATE

49 Stereo Comp-Lim/Gate

The compressor provides an automatically controlled volume envelope, which can be used to smooth out the level of an incoming signal (often done with guitars and vocals), or used to give a sound more "punch" (often done with drums).

SMALL VOCODER

The Vocoder effects superimpose the timbre of one signal (the Modulator) onto that of a second signal (the Carrier). A standard application of this is the "talking" instrument, in which you talk into a microphone and a guitar or keyboard sound is made to mimic the harmonic content of the speech. The Vocoders may be used for a number of other effects, including creating choral effects from a single singer and performing cross-modulation on two internal or external sounds.

The Vocoder does its timbral modification by dividing the Modulator and Carrier up into a number of different frequency bands; the more frequency bands which are used, the greater the definition of the Vocoder effect. To achieve the highest quality Vocoder, the Stereo Vocoder-Delay 1/2 algorithms (see below) use both effects slots; the Small Vocoder 1/2/3/4 algorithms use the normal effects configuration, making another effect simultaneously available.

50 Small Vocoder 1

This vocoder uses low to mid-high frequency bands. It has a wider band covering the bass range, for enhanced low-end response.

51 Small Vocoder 2

This vocoder uses mid-low to high frequency bands. It has a wider band covering the treble range, for enhanced high-end response.

52 Small Vocoder 3

This vocoder uses a number of low to mid-high frequency bands of even width.

53 Small Vocoder 4

This vocoder uses a number of mid-low to high frequency bands of even width.

STEREO VOCODER-DELAY

The two Stereo Vocoder - Delays are extremely powerful algorithms, and use both effects slots. When you select one of the Stereo Vocoders for Effect 1 or 2, the other Effect changes to display Stereo Vocoder as well.

For more information on vocoders, see the description of the Small Vocoders, above.

54 Stereo Vocoder - Delay 1

This vocoder uses wide frequency bands on the treble and bass ranges, and a number of narrower bands in the mid-range.

55 Stereo Vocoder - Delay 2

This Vocoder uses a number of bands of even width, across the frequency range.

8   *PATCH TOUR*

8.1   OVERVIEW OF PATCHES

The structure of the basic subtractive synthesizer patch hasn't changed much in twenty years. You start with a raw sound, such as a basic waveform or noise, filter it with a dynamic low-pass filter, and then contour it with a dynamic amplifier.

The Wavestation A/D's sound generation system contains 32 completely digital voices, each of which contain an oscillator, filter, amplifier, two envelope generators, and two LFOs. But the Wavestation A/D also makes some astonishing improvements on the classic analog model in several key areas. Let's touch on these briefly, while referring to Figures 8-1 through 8-3.

Figure 8-1 Four-Oscillator Patch Signal Flow
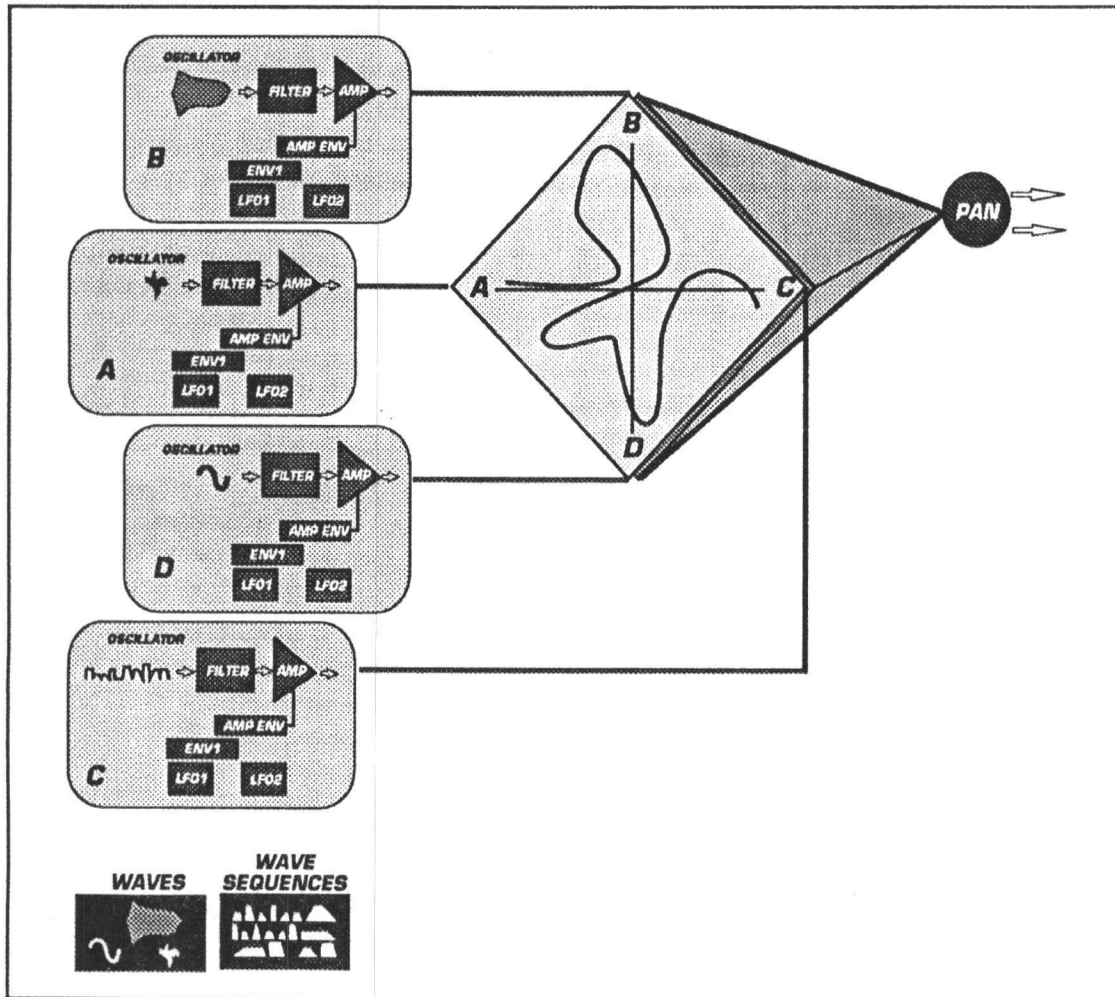
Oscillator Structure

A Patch can be defined to operate with four, two or one oscillator(s) -- which are actually complete voices. This structure choice creates the basic capabilities of the sound. More oscillators can produce richer, more detailed sounds, but using fewer oscillators allows you to play more keys (voices) simultaneously.

Each oscillator's basic pitch is programmable to the cent (1/100th semitone) over several octaves, enabling you to create effects ranging from delicate detunings to doubled octaves. Although the keyboard (or other controller) normally changes pitch using standard tuning, in which one keyboard octave equals one pitch octave, the keyboard slope is separately adjustable for each oscillator. This lets you implement "stretch," "shrink," and even (using negative slope values) inverse tunings.

Voice-based Patches

All Patch controls default to a Wave choice of ALL. So, normally, all four-, two-, or one oscillator(s) are summed together and receive the same synthesizer processing by common filter and amp parameters. However, a Patch can be made much more complex because each oscillator is in fact a complete synthesizer voice with its own filter, amplifier, two envelopes, and two LFOs.

Vector Synthesis

When the Patch structure is four oscillators, you can use Vector Synthesis to arrange for elegant dynamic timbre modulation (as shown in Figure 8-1).

When the structure is two oscillators, one-dimensional dynamic mixing is still available. For example, you can still easily fade a transient into an interesting continuous wave, or use Wave Sequences for the two oscillators (as shown in Figure 8-2).

### Figure 8-2 Two-Oscillator Patch Signal Flow
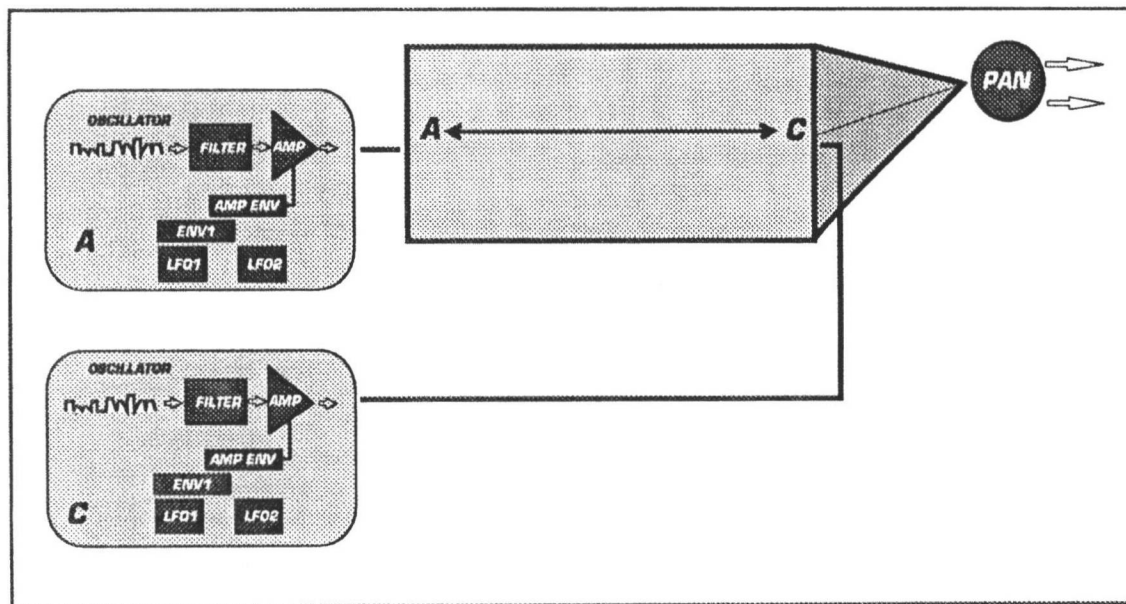
Waves

Each oscillator in the Patch can play any internal ROM waveforms plus those available from ROM cards. In general, waves can either be waveforms that loop continuously, or transients which play once. Waves can also be Wave Sequences.

Wave Sequencing

You can arrange for the oscillators to play from elaborate lists of wave selections. These Wave Sequences are treated just like normal waves, and can be processed in the same ways, including Vector Synthesis and Multi-Voice Patch processing. We'll tour Wave Sequencing more closely in the next chapter.

Figure 8-3 Single-Oscillator Patch Signal Flow
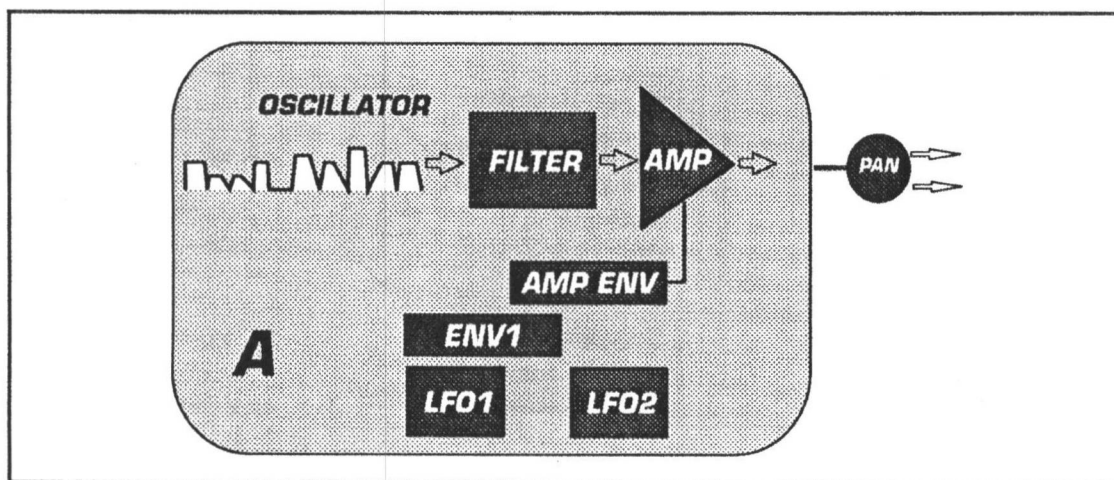
Filter

The traditional dynamic tone control has been enhanced with an "exciter" which can clarify the sound and add presence before attenuation by the amplifier.

Pan

Voices can be positioned anywhere in the stereo field, or panned by modulators.

Pan may be modulated by keyboard position or velocity using the the BUS A-B PAN page.

The PATCH BUS ASSIGNMENT page may be used to assign oscillators to any of the four outputs, allowing the joystick to control stereo or even quadraphonic panning.

The FX Bus parameter on the PERFORMANCE PART DETAIL page makes it easy to set the initial pan position of each individual part.

On the EFFECTS MIX page, the Mix 3/4 parameters of Parallel routing allow continuous control of pan via the modulation matrix. Finally, the Stereo Mod-Pan effects offer complex, LFO-driven panning.

Macros

Most of the parameters in a Patch are grouped into four modules: Pitch, Filter, Amplifier, and Pan. Each of these modules can be separately preset by *Macros*. Macros allow you to quickly make broad changes in a Patch, without having to adjust individual parameters. For example, amplifier Macros are available for all of the traditional instrumental envelopes. To get a basic contour, instead of dealing with a dozen envelope parameters, you simply select "Piano," "Clav," "Strings," and so on.

Figure 8-4 Patch Macros (in grey)
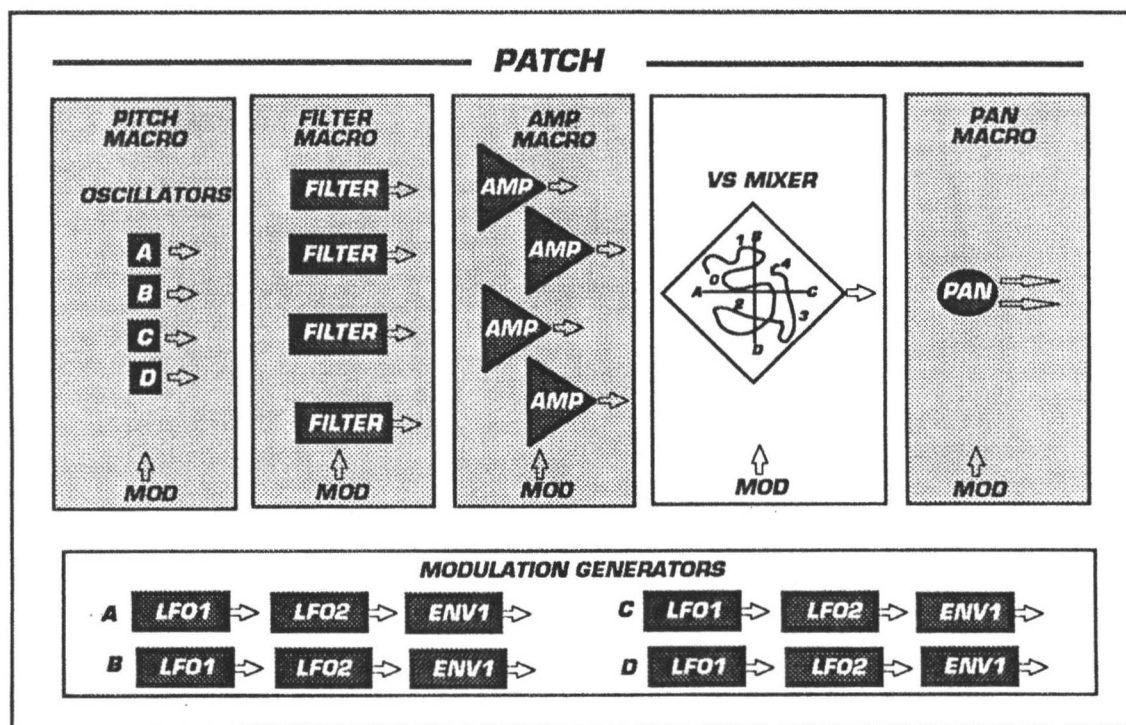
Modulation

An extensive modulation system underlies each Patch. The various sources and destinations can be reached via any of the destination modules. For example, under AMP ENVELOPE is the AMP MOD page. Most destinations can be assigned two discrete sources. Several destinations have additional, fixed modulation paths.
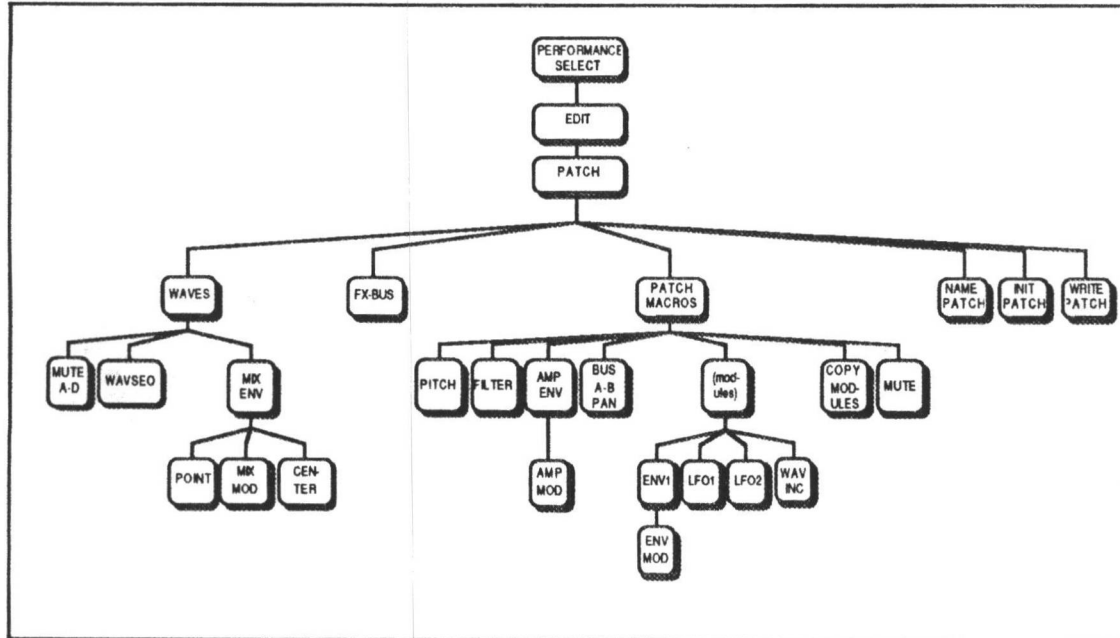
Figure 8-5 shows a typical way in which the general-purpose modulation sources and destinations could be patched. There are many more possible destinations than can be shown here.

Figure 8-5 General-Purpose Modulation Matrix (example)

GENERAL-PURPOSE MODULATION MATRIX

SOURCES ⟶ DESTINATIONS

LINEAR KEYBOARD
CENTERED KEYBOARD
LINEAR VELOCITY
EXPONENTIAL VELOCITY
AFTERTOUCH
MOD WHEEL
LFO 1
LFO 2
ENV 1
AFTERTOUCH + MOD WHEEL
MOD PEDAL
MIDI 1
MIDI 2

AMPLIFIER LEVEL
FILTER CUTOFF
MIXER X-AXIS
MIXER Y-AXIS
OSCILLATOR PITCH

Each path has an adjustable, bipolar amount.
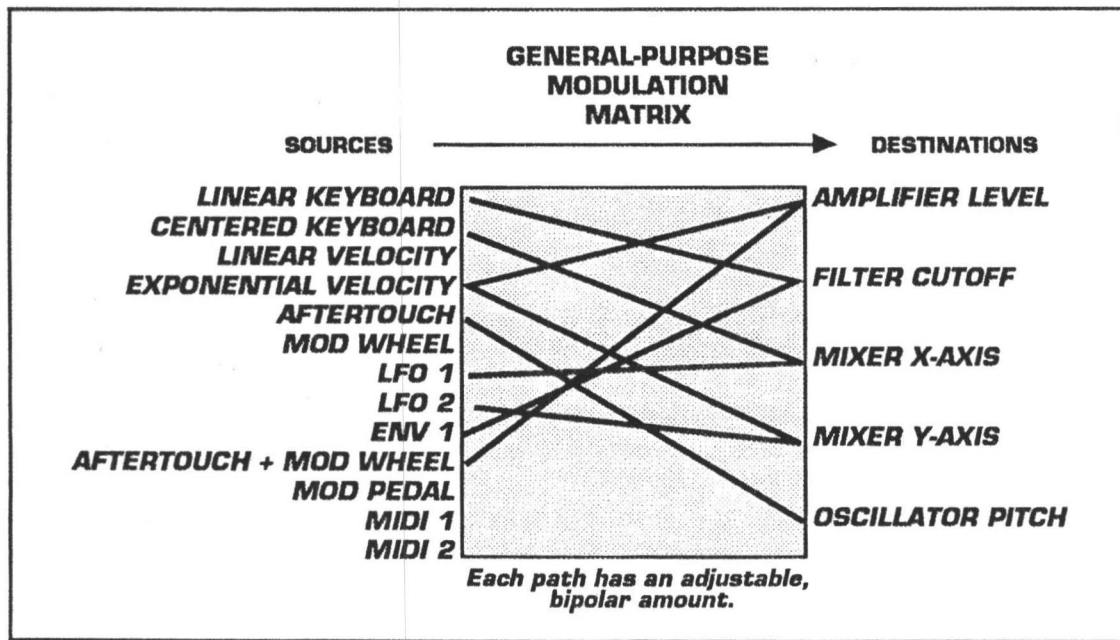
Finally, Figure 8-6 shows the menu organization of all the Patch resources.

Figure 8-6 Patch Menus

8.2   ENTERING PATCH EDIT MODE

Path: EDIT - PATCH

```
┌─────────────────────────────────────────────────────────┐
│ EDIT PATCH                           [Patch is edited.]  │
│ Patch:      RAM2  20 BATTERY ACID                        │
│ Structure:  4 oscillator                                 │
│ Hard Sync:  OFF                                          │
│                                                          │
│                                                          │
│  WAVES   MACROS   FX-BUS   NAME    INIT    WRITE         │
└─────────────────────────────────────────────────────────┘
```

The Patch selected here is the Patch in the Part highlighted on the Edit Performance page. Likewise, changing the Patch selected on this screen changes the Patch in the highlighted Part.

This is the main page for Patches. There are 35 per bank. Normally you'll proceed by entering the WAVES or MACROS pages -- with MACROS suggested first if you are new to the instrument.

You can also name, clear, or duplicate a patch from this page.

☛   To initialize a Patch, select INIT.

You'll get an "Are you sure?" warning.

☛   Press YES.

Now you start from scratch.

If you do begin a new Patch by initializing, probably your next choice is to set the Structure, since it is so fundamental to the Patch.

Structure

You can change the Structure at any time. When you change to a larger structure, the data for oscillator A is copied into the new oscillators. When you change to a smaller structure, data for unused oscillators is erased.
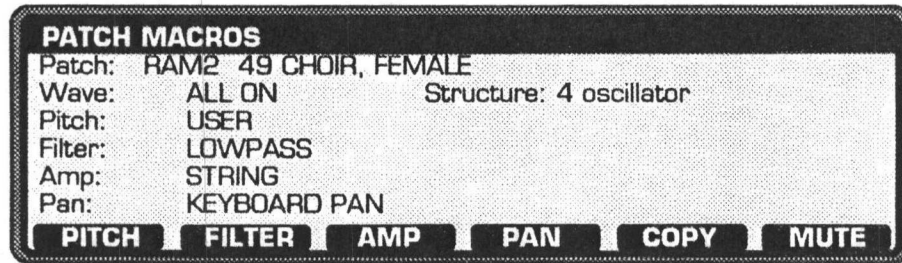
Hard Sync

When ON, B/C/D are synced to A. This means that regardless of the length of their cycles, they will always restart at the same time oscillator A does. This allows you to vary timbre by modulating the pitch of oscillators B, C, and D - see the Reference Guide [EDIT PATCH]. If the Structure is one oscillator, this parameter is not available.

8.3   SAVING A PATCH

☛   Save a Patch in the same way that you saved a Performance: on the EDIT PATCH page, press WRITE, then EXECUTE.

8.4   SELECTING MACROS

Path: EDIT - PATCH - MACROS

```
╔═══════════════════════════════════════════════════╗
║ PATCH MACROS                                      ║
║ Patch:   RAM2  49 CHOIR, FEMALE                   ║
║ Wave:    ALL ON            Structure: 4 oscillator║
║ Pitch:   USER                                     ║
║ Filter:  LOWPASS                                  ║
║ Amp:     STRING                                   ║
║ Pan:     KEYBOARD PAN                             ║
║   PITCH    FILTER    AMP    PAN    COPY    MUTE    ║
╚═══════════════════════════════════════════════════╝
```

☞   For each module (Pitch, Filter, etc.) try selecting different Macros.

☞   To construct a multi-voice Patch, instead of setting the Wave parameter to ALL, select A, B, C, or D individually.

When the need arises, you still have quick access to the individual Macro parameters by pressing the soft key with the same name (PITCH, FILTER, etc.). When you begin to edit specific parameters of a Macro, its title changes to USER. You can re-select any Macro simply by dialing.

Pitch

The Pitch Macros assign various modulations to the oscillator pitch. Choices include: DEFAULT, ENVELOPE 1 BEND, DESCENDING SWEEP, ASCENDING SWEEP, AFTERTOUCH BEND, MIDI-BEND, and AFT + MIDI-BEND.

Filter

The Filter Macro sets a basic tone and may include modulation. You can select: BYPASS, LOWPASS, LOWPASS/LFO, and AFTERTOUCH SWEEP.

Amp

The Amp Macro is generally the first place to turn when beginning to edit a Patch. You can quickly hear what any preset sounds like with the loudness (Amp) contours of different instruments.

Amp Macros are: DEFAULT, PIANO, ORGAN, ORGAN RELEASE, BRASS, STRING, CLAV, DRUM, RAMP, ON, OFF (can serve as a programmable mute).

Remember that this Macro can only do its work if the filter output contains enough sound material in the first place. For example, if the sound has a slow attack, the percussive amplifier Macros won't be very effective.
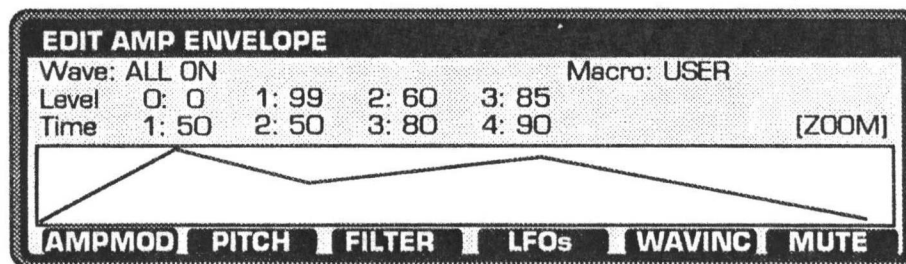
Pan

The Pan Macros control the modulation of the initial Pan position which is set using the PERF PART DETAIL FXBus parameter.

Pan Macros include: KEYBOARD-PAN, VELOCITY PAN, KEY + VELOCITY, and OFF.

8.5   TWEAKING THE AMPLIFIER

Path: EDIT - PATCH - MACROS - AMP

```
EDIT AMP ENVELOPE
Wave: ALL ON                          Macro: USER
Level   0:  0    1: 99    2: 60    3: 85
Time    1: 50    2: 50    3: 80    4: 90              [ZOOM]

AMPMOD   PITCH   FILTER   LFOs   WAVINC   MUTE
```

Suppose that the Amp Macro you have selected is close, but not quite right for the Patch you want. Perhaps you need to speed up the envelopes so that you can play it faster. Here is where you do it.

The amp envelope has four segments, with breakpoints labeled 0, 1, 2, 3, and 4. Points 0 - 3 have levels, while the value of point 4 is always 0. Points 1 - 4 have times: Time 1 is the duration from point 0 to point 1, and so on. Point 3 is the sustain point. Only when the key is released does the envelope proceed from point 3 to point 4.

☞   Cursor to the desired fields and change the values.

Any changes that you make will be reflected in the graphic display.

When you raise the total time sufficiently, the display automatically scales the graphic to fit on the page. ZOOM will appear to tell you that you are viewing a compressed graphic.

Amplifier Modulation

Path: EDIT - PATCH - MACROS - AMP - AMPMOD

```
EDIT AMP MOD
Wave: ALL ON
Velocity Envelope Amount: +127
Source 1: LFO1                      Amt: +10
Source 2: LFO2                      Amt:   0
Attack Velocity Mod:      +50
Envelope Keyboard Mod:  +66
PITCH   FILTER   ENV 1   LFOs   WAVINC   MUTE
```
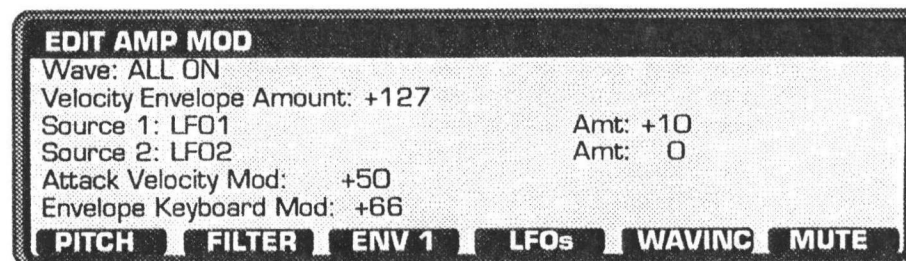
After setting the basic feel of the Patch, come here to adjust its velocity response, as well as other amplifier modulation. For example, increasing the Velocity Envelope Amount makes the Patch increasingly sensitive to velocity. Applying positive modulation to the Attack Velocity Mod parameter accelerates the attacks (Amp Envelope time 1) of notes that you play harder. Applying positive modulation to the Envelope Keyboard Mod shortens the lengths of Amp Envelope times 2 and 4 as you play higher on your controller.

8.6 TWEAKING THE FILTER

Path: EDIT - PATCH - MACROS - FILTER

```
EDIT FILTER
Wave: ALL ON          Macro: USER
Initial Cutoff: 75
Keyboard Tracking: +1
Exciter Amount: 55
Source 1: ENV1          Amt: +10
Source 2: LFO2          Amt:  0
  PITCH    AMP    ENV1    LFOs   WAVINC   MUTE
```

The filter module determines overall tone color. The FILTER page contains the frequently-used Cutoff and modulation Source settings. In practice, you often need to balance these adjustments against each other.

Try using the exciter to increase high-end clarity.

Envelope 1 is often used to modulate the filter. Its parameters are similar to those of the Amplifier envelope.

8.7 ASSIGNING WAVES

Path: EDIT - PATCH - WAVES

```
WAVES
Patch:   CARD 37 MIDIWORLD
Structure:  4 osc                 Lev   Semi   Fine   Slope
A - CARD  34   GUITAR PLUCK        99    -12    +6    +0.30
B - ROM  111   SHELL DRUM          99    +1      0    +2.00
C - CARD  25  *WAVESEQ             99     0     -3    -0.40
D - ROM   83   ALTO SAX            75     0     -3    +1.00
  MUTE A    MUTE B    MUTE C    MUTE D    WAVSEQ    MIXEV
```

NOTE: The WAVSEQ soft key does not appear unless the patch contains a Wave Sequence (wave numbers 0 - 31).

Waves can be found in ROM or on PCM Cards, where locations #32 and up are looped waveforms or transients. In addition, in ROM, RAM1/2, and ROM or RAM Program Cards, waves #0-31 are Wave Sequences. These are identified by an asterisk (*) before their names.

In addition to having a wave selection, each oscillator's initial pitch can be coarsely or finely tuned. A little detuning can enrich the sound.

Also, instead of the pitch of the oscillators always tracking with standard keyboard intonation, they can have individual tracking slopes. A value of +1.00 is normal.

Slope values above +1.00 increasingly stretch the oscillator tuning. In other words, above C4 the oscillator gets increasingly sharp, and below C4 the oscillator gets increasingly flat. Since the ear is less pitch-sensitive in the bass

and treble ranges, most acoustic pianos and some electric pianos are actually stretch tuned. A moderate use of this parameter helps to imitate this.
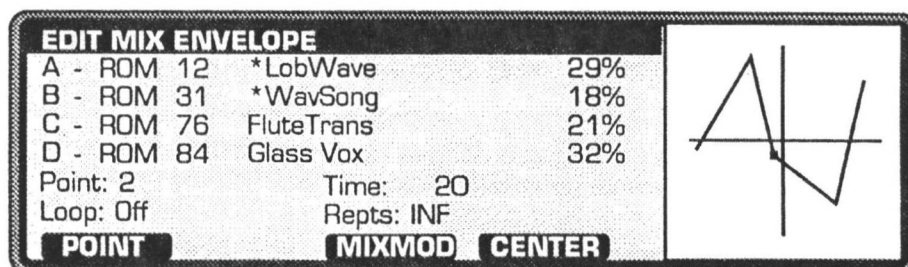
Conversely, decreasing the slope from +1.00 shrinks the oscillator tuning.

Negative values cause the oscillator to inversely track the keyboard (or other controller). Normally you would use this adjustment on oscillators that contribute harmonics within a patch, rather than on ones responsible for fundamental pitch.

Keyboard Slope may also be used to play microtonal scales. A slope of 0.50, for instance, produces the quarter-tone scale. For more information, see the Reference Guide [EDIT SCALE].

8.8   VECTOR SYNTHESIS

Path: EDIT - PATCH - WAVES - MIXEV


```
EDIT MIX ENVELOPE
A - ROM 12    *LobWave        29%
B - ROM 31    *WavSong        18%
C - ROM 76    FluteTrans      21%
D - ROM 84    Glass Vox       32%
Point: 2           Time:    20
Loop: Off          Repts: INF
  POINT            MIXMOD  CENTER
```

☞   To set the levels of the mixer envelope, select a point and then use the joystick to set the position.

As you select points and move them with the joystick, the graph updates to show the vectors you create.

☞   To set equal levels for all oscillators at the current point, press CENTER.

This sets all levels to 25% in four-oscillator mode, or 50% in two-oscillator mode.

The Mix Envelope implements *Vector Synthesis* by allowing you to set the relative loudness of each oscillator at each of five break-points. You can also set the time values for each of the four envelope segments. Altogether, this allows you outstanding control of the dynamic mixture of the oscillators over the duration of a note.

For example, in the graph above, the note starts with oscillator A predominant, changes to mostly B at point 1, provides a roughly equal mixture of all 4 oscillators at point 2, and then moves to a 50/50 mix of C and D at point 3. The mixture stays at point 3 as long as the note is held, and then releases to point 4, which is a combination of B and C. The result of this vector-defined mixing is a complex, dynamic timbre.

With four-oscillator structures, a two-dimentional graphic displays the values of each of the breakpoints (but not the times of the envelope segments). Two-oscillator structures have a linear graphic display.

Nothing prevents you from choosing Wave Sequences for the oscillators, and applying Vector Synthesis over all four of them.

Figure 8-6 Another View of Vector Synthesis . . .

VECTOR SYNTHESIS
4-Oscillator
Structure
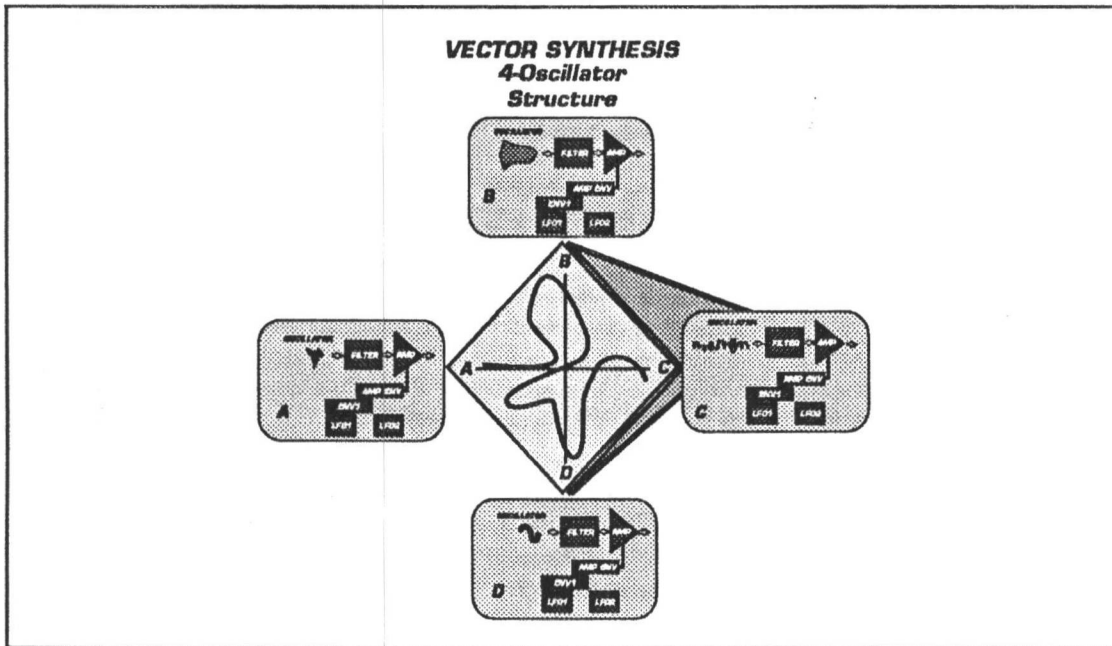
Note that the page example assumes a Structure of four oscillators. With a two-oscillator structure, only the A-C mix is available.

Figure 8-7 . . . and of Two-oscillator Dynamic Synthesis

2-Oscillator
Structure
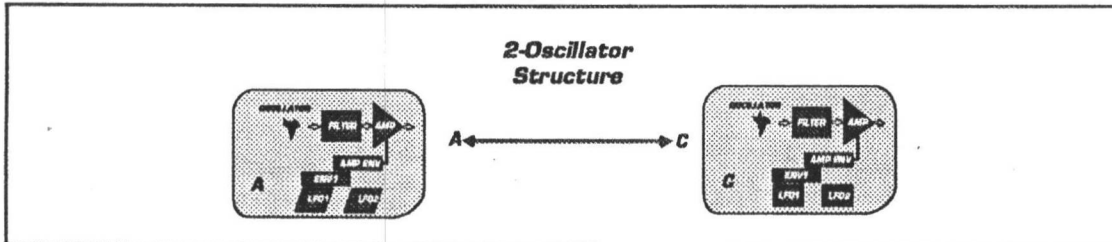
With a two-oscillator structure, the mix of Waves A and C is displayed as points on a line.

If you have a single-oscillator Structure there can be no mixture, so the mix envelope screen is not available.

In addition to the features listed above, the Mix Envelope may be looped between various points, using either forward only or forward and backward looping. It is also possible to route two modulation sources to each axis of the mix (A-C and B-D), for even further dynamic control of the vector timbre. For more information, see the Reference Guide [EDIT MIX ENVELOPE] and [EDIT MIX MOD].

9 WAVE SEQUENCE TOUR

9.1   INTRODUCTION TO WAVE SEQUENCING

Since Wave Sequencing is the Wavestation A/D's principal innovation, we might as well discuss it a bit before attempting to make music with it.

You are probably aware of MIDI sequencers that play synthesizers by sending notes to them. Imagine a MIDI setup of several different synthesizers and samplers, each with their own characteristic sounds. Now suppose that you have created a multi-timbral sequence which plays these instruments and switches patches on them so quickly that perhaps 50 different sounds can be heard during one note. It seems that such a system, if you could pull it off, would be capable of some astonishing sounds.

Well, this kind of power is exactly what the Wavestation A/D's Wave Sequencing provides, although instead of requiring a MIDI setup full of synthesizers and samplers, all the selection and mixing occurs seamlessly, digitally, within one highly-integrated instrument.

In the same way that most drum machines have songs which are just lists of patterns played consecutively, a wave sequence is like a song made of waves. The result is one continuously evolving waveshape that yields very sophisticated textures.

For example, this diagram shows a seven-step wave sequence, with each step having a different sound (wave), level, and crossfade time.

Figure 9-1 A Wave Sequence with Seven Steps
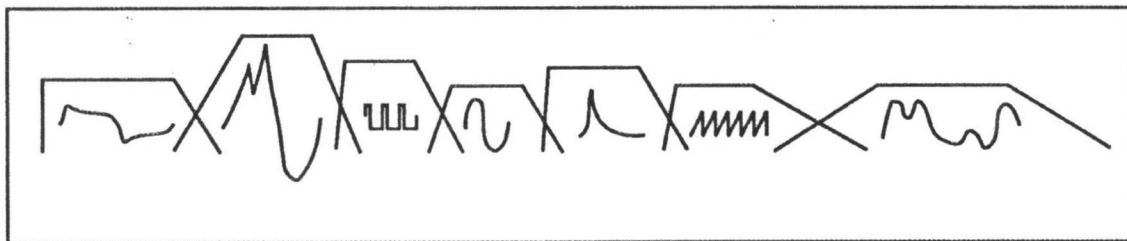
Note that this rough drawing is not a waveform, but a picture of the overall amplitude envelope of the wave sequence. Generally, a Wave Sequence crossfades between the wave steps.

In a Patch, each oscillator can have its own Wave Sequence. Thus, even with only one Patch, up to four of these wave "songs" can play simultaneously during a single note.

The diagram below shows four tracks of Wave Sequencing. Here, almost forty different timbres are mixed together within the brief duration of one note.

Figure 9-2 Four Wave Sequences (In one note)
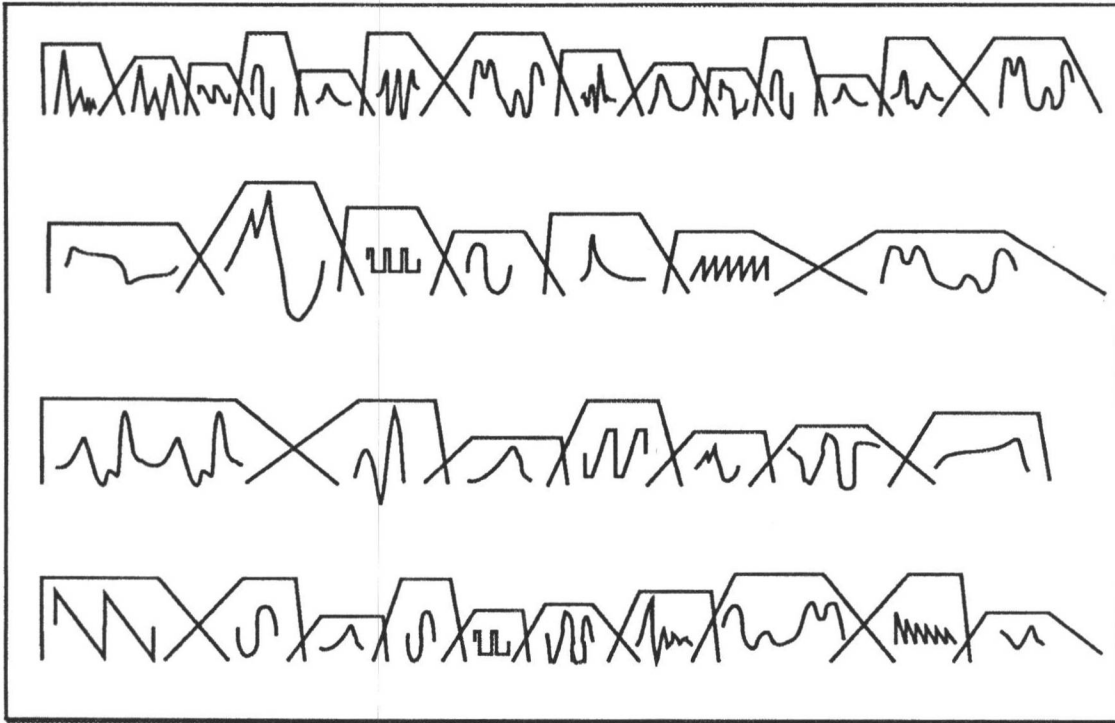
Each memory bank contains 32 Wave Sequences, which are referred to as Waves #0 - 31. One Wave Sequence can have up to 255 steps, and each bank can contain a total of 500 steps. What is more, special care has been taken to make Wave Sequences expressive. You can set loops over a sequence so that a range of steps plays 1- 126 times, or plays continuously. The start point of the Wave Sequence, and the progression from step to step, can be modulated. Additionally, Wave Sequences are treated just like discrete waves, so you can still apply Vector Synthesis (two-dimensional mixing) to the four-track Wave Sequence.

By layering Patches in Performance mode, you can play up to 32 different Wave Sequences simultaneously (the actual number depends on how much crossfading you have defined.) On top of this, add multi-voice synthesis functions such as envelope and LFO modulation for each sequence. Finally, there's the whole realm of modulatable effects from the MDE processor.

It is debatable whether we can imagine sounds as complex and potentially expressive as are suggested by four-track wave sequencing without actually having the Wavestation A/D with which to hear and communicate them. Orchestrating such a density of timbre might well qualify as advanced synthesis -- composition enveloping *music concrete*, resynthesis, and "granular" synthesis, which until now has appeared only in computer music research centers. In a few hours you can be whipping out sound collages that until fairly recently would have taken a battery of tape artists or computer programmers several weeks to create. Seen in this light, the Wavestation A/D actually offers a major, expensive studio art form in a performer's package.

create. Seen in this light, the Wavestation A/D actually offers a major, expensive studio art form in a performer's package.

By this time you might be thinking that the Wavestation A/D offers a mind-boggling amount of timbral versatility - and you'd be right. By combining the precision of wavetable oscillators, the accuracy of sampled sounds, the dynamics of Vector Synthesis and Wave Sequencing, and a dual effects processor, as well as proven expressive modulation paths rooted in its voltage-controlled heritage, the Wavestation A/D has everything you need to create astounding sounds.

This manual can only scratch the surface of Wave Sequencing. As always, the best approach is to just get in there and start editing the factory Wave Sequences and Wave assignments.

So you can start doing just that, let's move on to Wave Sequence editing! Figure 9-3 shows how the Wave Sequencing system is organized.

Figure 9-3 Wave Sequence Menus
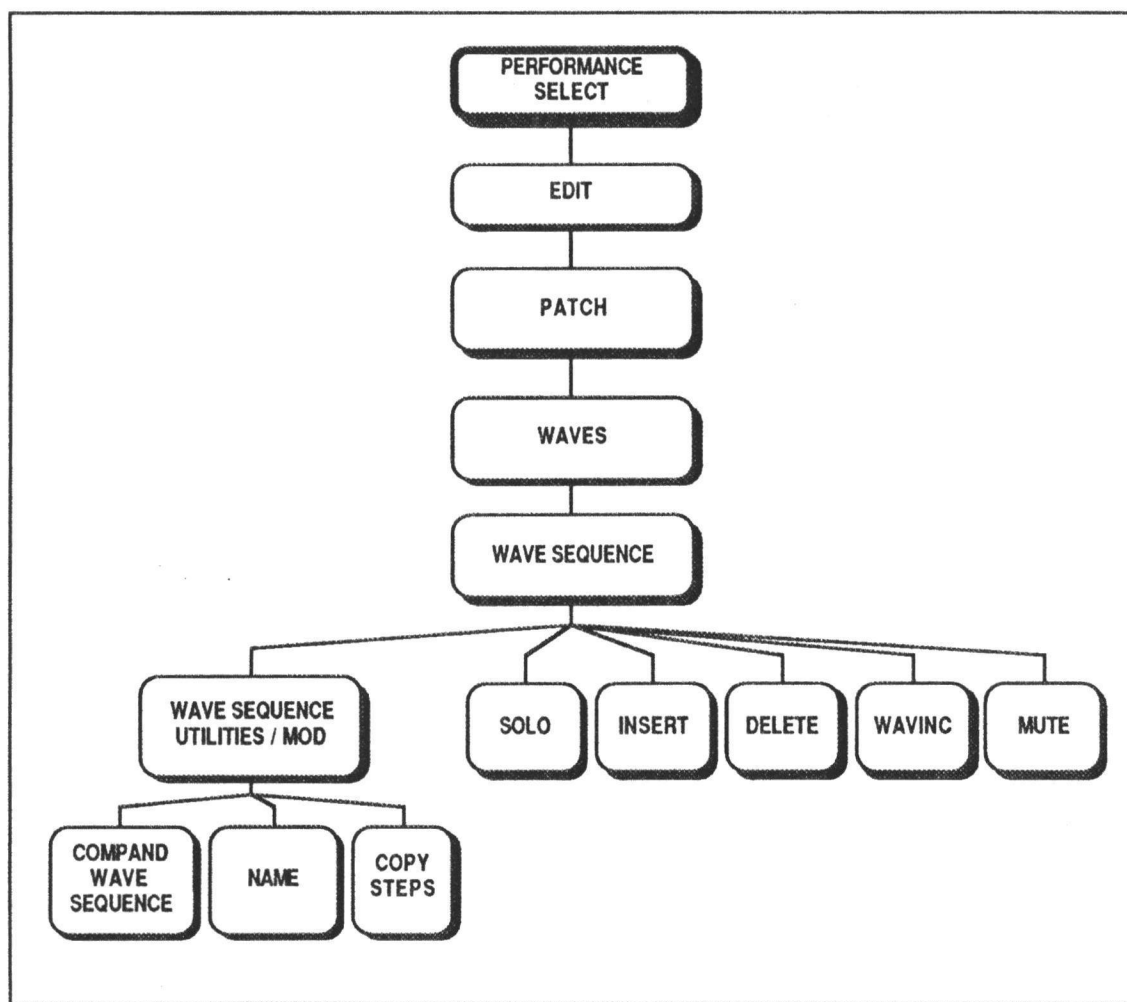
9.2 BUILDING WAVE SEQUENCES

Path: EDIT - PATCH - WAVES - WAVSEQ

NOTE: The WAVSEQ soft key does not appear unless you select at least one Wave Sequence on the WAVES page.

```
WAVE SEQUENCE
Wave: A  ON              Wave Seq: RAM2 31 Richter        ↓
Step    Wave                     Semi Fine Lev   Dur  Xfd
  1     CARD   37 Trumpet         +24   0    75   395  124
  2     ROM    100 SynthPad       -12   +1   56   Gate 10
  3     ROM    101 Birdland         0   -20  80   482  733
Loop Dir: B/F       Start: 3       End: 7              Repts: OFF
  UTILS      SOLO    INSERT   DELETE   WAVINC    MUTE
```

Here is where you select the waves for each step of the selected Wave Sequence. Loop control is also included on this page.

Wave Sequences are always automatically saved, so it is not necessary to manually save them. Since this is the case, it's a good idea to back up any important Wave Sequence before editing it. Wave Sequences are stored in internal RAM or Performance cards.

Each step can be customized with parameters for tuning offset in Semitones and Cents, sustain Level, sustain Duration, and Crossfade with the next step.

9.3 WAVE SEQUENCE UTILITIES and MODULATION

Path: EDIT - PATCH - WAVES - WAVSEQ - UTILS

```
WAVE SEQUENCE UTILITIES
Patch: CARD 10 SUPER SOUND
Wave:    A  ON    Wave Seq: CARD 16 OB Sax
Mod Source: ENV 1
Mod Amount:   +127
Start Step:   13
Compress/expand time values by   100%
 COMPAND              NAME    COPY   WAVINC    MUTE
```

This page allows you to modulate the starting step of the Wave Sequence, or to use a mod source to control the progression from step to step. It also lets you stretch or shrink the overall time of a Wave Sequence.

Modulating the Wave Sequence start step can be a very useful, expressive trick. You can, for instance, create a Wave Sequence of a number of waves with different, interesting attack transients, and then set Velocity as the Mod source. By playing at different velocities, you select which wave sounds first, changing the attack transient on every note if you so desire. This is a little like using the Key/Velocity Zones page to set up a velocity switch - but you can use modulation to select from up to 127 of the 255 waves in a single Wave Sequence, with up to four of those playing in one patch, and up to eight patches playing at one time...there are a lot of sounds waiting to be created; see what you can discover.

10 ANALOG INPUTS TOUR

10.1 INTRODUCTION TO THE ANALOG INPUTS

So far, this Player's Guide has been primarily concerned with the many ways of getting sound <u>out</u> of the Wavestation A/D. There is one remaining topic, however; another feature which makes this instrument unique among modern digital synthesizers - the ability to bring sounds <u>in</u>, in real time. This is what the "A/D" stands for - Analog to Digital conversion.

The Analog Inputs enable you to do a number of different things. A simple but very effective application is to use the Wavestation A/D's effects to process external sound sources. Synthesizers, electric guitars, singers, laughing hyenas - anything that you can get a signal from, or capture with a microphone, can take advantage of the Wavestation A/D's MDE effects. Two additional processing options - a filter and an exciter - are available for each Input on the ANALOG INPUT ASSIGN page itself.

Another possibility is that of using external sounds as waves, source material for the Wavestation A/D's synthesis engines. A sound from another synthesizer - or, for that matter, an entire audio mix - can become the basis for a Wavestation A/D Patch, with filtering, amplitude envelopes, panning, and so on.

Additionally, the Vocoder effects open up new possibilities for innovative timbres. The Vocoders can combine any internal sounds and/or Analog Inputs into hybrid textures, such as "talking guitars" or voice-boxes.

Perhaps best of all, the Wavestation A/D's powerful sound creation facilities are still active alongside the Analog Inputs, so you can use external and internal sounds at the same time!

10.2 SETTING UP THE ANALOG INPUTS

First of all, you need to connect a source to the inputs - a synthesizer, guitar, microphone, or mixer output, for instance - and set the initial gain levels. To do this:

☞ Turn the output of the Wavestation A/D all the way down.

☞ If you are using outputs 3 and 4, turn the mixer channels which they feed into all the way down.

☞ Plug the output(s) of your source into the Analog Input(s). If you are using a mixer output as the source, make sure that the Wavestation A/D's outputs are not part of that mix - otherwise, a feedback loop would be created.

☞ Set the initial gain for each of the inputs, using the Gain and Level controls on the back panel. For most synthesizers, mixers, and signal processors, the Gain should be set to the middle setting of -10 dBu. For microphones, it should be set to the lowest setting of -40 dBu. For some professional audio equipment, the highest setting of +4 dBu should be used.

☞ After setting the initial gain, adjust the Level knob while looking at the level LEDs on the front panel. The rightmost LED indicates digital clipping, and stays lit for about a third of a second, so that it is easy to see.

The signal should be such that the leftmost (-10) and middle (-3dB) LEDs are lit as much as possible without the clipping LED lighting at all. Digital clipping is much more noticeable than its analog counterpart, and should be avoided.

☛ Turn the Wavestation A/D's output and mixer channels back to their normal levels.

If you wish to make quick adjustments to the volume of the Inputs after setting the initial gain and level, you can use the VOL parameter on the Analog Input Assign page, discussed below. The VOL for each of the Inputs can also be controlled in real time by MIDI Volume (Controller #7).

☛ On the ANALOG INPUT ASSIGN page, set Inputs to ENABLED, and select one of the Analog Macros to route the Inputs within the Wavestation A/D. For more information on the Analog Macros, see below.

Now that you know how to set up the Inputs, let's look at some applications for them.

10.3   PROCESSING EXTERNAL SOUND SOURCES

You can use the Wavestation A/D's MDE effects to process external sound sources for a number of purposes, in both live and studio situations. In addition to adding effects, the Wavestation A/D (in conjunction with a MIDI sequencer) can serve as an automated two-channel mixer. The combination of these abilities is especially effective in processing live instruments or singers, or recorded tracks. To demonstrate some of the possibilities of this, we'll go through a detailed example.

Let's say that you are working on a multitrack recording with two tracks - lead vocal and guitar - which you want to process through the Wavestation A/D. The vocal will be run through an Early Reflections effect, and the Quadrature Chorus will be used on the guitar. First, using the direct outputs from your mixer channels or the tape deck itself, you should follow the directions in Section 10.2, SETTING UP THE ANALOG INPUTS, using Input 1 for the vocal and Input 2 for the guitar. Connect the Wavestation A/D's outputs to the board you'll use for the mixdown, and be sure that the routing is such that this signal is <u>not</u> being fed back into the Analog Inputs.

Next, go to the Analog Input Assign page.

Path: **GLOBAL-ANALOG**

ANALOG INPUT ASSIGN								
Inputs:ENABLED					Macro:PARALLEL 1			
INPUT	MIDI					FX BUS		
#	CHAN	VOL	FILT	XCTR	A	B	C	D
1	1	127	99	0	ON	ON	OFF	OFF
2	2	127	99	0	OFF	OFF	ON	ON

You will recall, from the Effects Mix graphic, that there are four sources feeding into the two effects: Buses A, B, C, and D. To process external sound sources through the Wavestation A/D's effects, you must first assign the Analog Inputs to at least one of these Effects Buses (if you were using the Inputs as waves,

however, the Inputs should be OFF for all the Buses). You could set up each of the Buses by hand, but you can also simply dial up one of the preset Macros, which provide most of the commonly used settings. In this case, you could use the PARALLEL 1 Macro, as shown on the previous page.

The FILT (filter) and XCTR (exciter) parameters provide initial signal processing for the Inputs. If the sound is too bright, for instance, you might try turning down the filter; if you want to add high-end clarity, try increasing the exciter amount.

In this example you're processing two separate sources through two different effects, so you'll want to set up the two effects in a Parallel configuration - Early Reflections 1 as Effect 1, Quadrature Chorus as Effect 2. The PARALLEL 1 Macro, as shown on the previous page, will then send Input 1 (the vocal) to Effect 1 (Early Reflections), and Input 2 (guitar) to Effect 2 (Chorus).
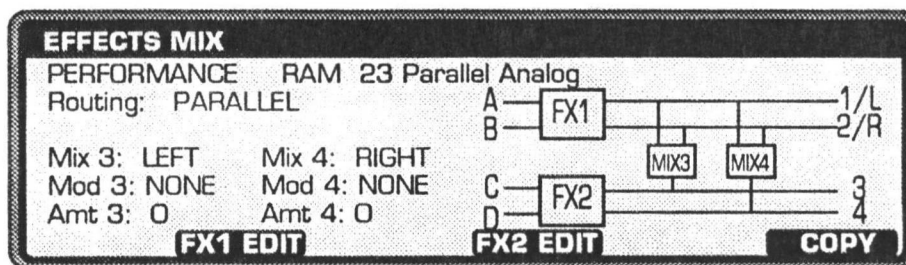
If you're using only the stereo outputs (1 and 2), you should go to the Effects Mix page and set Mix 3 and 4 to Left and Right, respectively. This will ensure that the output of Effect 2 is included in the mix. Setting the Mix 3/4 parameters to OFF will remove them from the stereo mix, sending them to outputs 3 and 4 only. For more information on the Effects Mix page, see Section 7.2, Effects Buses and Routing.

This done, you are now set up to mix! You might first wish to use a Performance (or Multiset) to save this effects configuration, so it can quickly be recalled at a later date.

10.4 MIDI MIXING WITH THE ANALOG INPUTS

As mentioned above, the volume of each Input may be independently controlled, in real time, by MIDI Volume. If you have a MIDI sequencer that can be synchronized to your tape recorder, you can use the Wavestation A/D as an automated mixer, controlling anything from simple fade-outs to complex muting sequences from a MIDI sequencer. Continuing with the example from Section 10.3, let's say that you want to mute several sections of the vocal part and fade out the end of the guitar solo.

First of all, set up a MIDI sequencer to record from and play back to the Wavestation A/D, as described in Chapter 5 (Using MIDI). You should also set up your sequencer to synchronize with your tape recorder, following the directions for your particular sequencer and synchronization equipment. Then, go back to the Analog Input Assign page.

The MIDI CHAN parameter on this page sets the MIDI channel upon which each Input will receive MIDI Volume. Since the Wavestation A/D's Performances also respond to MIDI Volume, it's best to set the Analog Inputs to channels which you don't intend to use for other purposes - eg., something other than the Basic Channel. We'll set them to 15 and 16, so that if you're using a Multiset for this

recording, you'll still have 14 free channels. In general, you should decide on the channels which you wish to use for the Analog Inputs, and then leave them at that setting.

Since you can use your sequencer to record and edit MIDI Volume changes, the mix does not have to be performed in real time - it can be done track by track, allowing you to perfect every nuance. This being the case, we'll start by doing the fade-out of the guitar solo.

Fade-outs

Cursor to the Input 2 Vol parameter, so that this can be changed by moving the rotary dial (or other data entry controls). To ensure that the initial volume level is correct, you'll record a level of 127 (the maximum) at the beginning of the sequence, by moving the dial slightly counterclockwise ("down") and then back clockwise ("up") to 127. As you move the dial, the Wavestation A/D sends out MIDI Volume messages (Controller #7) to the sequencer, which records them. Be careful not to record over this initial setup data.

Next, sync your sequencer to the tape deck as normal, begin recording on the sequencer (after the initial volume data), and run the tape to the end of the solo. When you want the fade to begin, slowly move the dial to turn the Input 2 Volume to zero. You can now play the sequence back, and hear your fade "performed" by the sequencer and the Wavestation A/D. You can even edit the fade, if your sequencer is capable.

Muting

Programming mutings on the vocal track can be done in a similar way. Insert the initial volume level and prepare to record, as described above. Unlike gradual fades, mutings are instantaneous volume changes, and so instead of mixing with the dial, you'll use the numeric keypad. At the beginning of each mute, you'll record a level of 0; at the end of each mute, you'll return the volume to the initial level (let's say 127). Remember that, when using the numeric keypad, values are not changed until the ENTER key is pressed, so you can initiate a mute with a single button-press, allowing for greater timing precision. For the first mute, type in "0" well ahead of time, and then hit ENTER at the exact moment that you want the mute to begin. To end the mute, type in the initial volume "127" ahead of time, and then hit ENTER when you want the mute to end. For complex muting sequences, you may want to record in several passes.

If your sequencer can edit controller data, you can use this for even finer control over volume changes. Since the Inputs use the standard MIDI Volume controller, you can also use any device which can send controller messages - such as hardware or software faders - to do your mixing.

Remember that, in addition to adjusting the Input volumes, you can also modulate the effects in real time. You can use this to change the amount of reverberation from section to section, for instance, or add delay on only the last word of every chorus.

10.5   OTHER ANALOG INPUT ASSIGN SETUPS

Stereo source to serial effects

If you use any synthesizers or samplers which don't feature built-in effects, you can simply connect their audio outputs to the Wavestation A/D's Analog Inputs and *voilà* - chorus, reverb, flange, and delay to your heart's content. This is especially convenient if you are already stacking the sound of a module with that of the Wavestation A/D, as it allows you to easily apply global effects to the entire timbre.

If you are using a single, stereo source, such as a sampler (like the KORG DSS-1) or other synthesizer (like the KORG DW-8000), you may want to process it through both effects. To do this, dial up the A-B STEREO Macro, as shown below, and use a Serial effects configuration.

ANALOG INPUT ASSIGN

Inputs:ENABLED   Macro:A-B STEREO

INPUT	MIDI				FX BUS			
#	CHAN	VOL	FILT	XCTR	A	B	C	D
1	1	127	99	0	ON	OFF	OFF	OFF
2	2	127	99	0	OFF	ON	OFF	OFF

For sending a stereo source through Effect 2 only, you can use the C-D STEREO Macro, adjusting the Effects Mix accordingly.

Mono source to serial effects

If you wish to process a single, non-stereo source (such as a guitar) through serial effects, you can use the A-B MONO Macro, as shown below. Make sure to connect the source to Input 1.

ANALOG INPUT ASSIGN

Inputs:ENABLED   Macro:A-B MONO

INPUT	MIDI				FX BUS			
#	CHAN	VOL	FILT	XCTR	A	B	C	D
1	1	127	99	0	ON	ON	OFF	OFF
2	2	127	99	0	OFF	OFF	OFF	OFF

For sending a monophonic source through Effect 2 only, you can use the C-D MONO Macro, adjusting the Effects Mix accordingly.

10.6   USING EXTERNAL SOUNDS AS WAVES

If you scroll to the end of the list of PCM waves on the WAVES page, you'll see the two choices Input 1 and Input 2 - the two Analog Inputs. These can be used just like the PCM waves, and processed through filters, amp envelopes, panning, etc. The only functions not available are those that alter pitch, such as the settings on the PITCH page, and the Semitone, Fine tuning, and Slope parameters on the WAVES page. Playing notes over MIDI also will not change the pitch of the Inputs, unless the source sound is being generated by a MIDI instrument (see below).

Generally, when using the Inputs as waves, you should make sure that they are not being routed on the Analog Inputs Assign page. To do this, set Inputs to DISABLED on the ANALOG INPUT ASSIGN page (this only turns off the bus routing - Inputs can always be used as waves).

When you use the Input 1/2 waves, audio coming into the Analog Inputs is not constantly sent to the effects, as in the examples above; it is instead gated by the keyboard. This means that, just like PCM waves, the Inputs are only heard when a key is depressed.

As with the examples above, you can still use internal Wavestation A/D sounds along with the Analog Input waves. A four-oscillator patch, then, might use one Input and three ROM PCM waves.

Processing another MIDI synthesizer

If you wish to use a sound from another MIDI synthesizer, sampler, etc. as a wave, there is an elegant way of accomplishing this.

This technique works best with monophonic (one note at a time) playing.

- ☞   First, connect that synth to the Wavestation A/D's Analog Input(s).

- ☞   Set up your MIDI system so that your master controller is received by both the Wavestation A/D and the source synthesizer.

- ☞   Create a new Patch and go to the WAVES page.

- ☞   If your source is non-stereo, assign Input 1 as wave A and skip the next step.

```
WAVES
Patch:    CARD 37 InputPatch
Structure:  1 osc            Lev   Semi   Fine    Slope
A - ROM  397   Input 1        99    0      0      +1.00


[ MUTE A ] [ MUTE B ] [ MUTE C ] [ MUTE D ] [ WAVSEQ ] [ MIXEV ]
```

☞ If your source is stereo, change the structure to 2 osc structure. Assign Input 1 as wave A and Input 2 as wave C, and then go to the PATCH BUS ASSIGNMENT page. Set Wave A ON for only Bus A, and Wave C ON for only Bus B, as shown below. This will cause the inputs to be hard-panned, left and right, to the stereo outputs. Make sure that the FX Bus parameter on the Performance Part Detail page is set to PATCH, so that the assignments you just made will be used.

PATCH BUS ASSIGNMENT						
Patch: RAM2 34 SINUSOID PATCH						
WAVE		FXBUS	A	B	C	D
A: ROM 397	Input 1		ON	OFF	OFF	OFF
C: ROM 398	Input 2		OFF	ON	OFF	OFF
WAVES MACROS						

☞ Since your master controller is playing both the Wavestation A/D and the source synthesizer, they will both trigger notes simultaneously. This means that as soon as a note starts on your source synthesizer, with its filter envelope, amplitude envelope, etc., the Wavestation A/D's own envelopes will start up. The two synthesizers are thus synchronized, enabling you to create a sound accurately combining the sound of both instruments.

Also, although the Wavestation A/D itself is not changing the pitch of the Analog Inputs, the pitch is controlled at the source synthesizer via MIDI. The Mod Pitch Shift - Delay effect can also be used for modulatable pitch changes, such as "whammy bar" effects.

☞ Create a Patch to process the source synthesizer by adjusting the Patch Macros parameters.

Using other sounds as waves

Other sounds, such as environmental recordings or noise sources, may provide interesting material for waves. In general, these sources should be fairly continuous, making sound all of the time, so that when you press down the key, there will be something for the Wavestation A/D to play. Using intermittent sources, however, may provide for interesting, semi-aleatoric timbres.

You might, for instance, try recordings of wind, sea, or crowd noises. Try setting up a looped sound on a sampler, or an interesting timbre on a synthesizer, and holding down the sustain pedal to make them sound indefinitely as you play on the Wavestation A/D. Experimentation is the key here.

One of the more interesting and traditional uses of external sounds is that of the vocoder, which is discussed next in its own section.

10.7   USING THE VOCODER EFFECTS

The Vocoder effects superimpose the timbre of one signal (the Modulator) onto that of a second signal (the Carrier). A standard application of this is the "talking" instrument, in which you talk into a microphone and a guitar or keyboard sound is made to mimic the harmonic content of the speech. Other uses discussed below include simulated choirs and timbral cross-modulation, and many variations are possible depending on the characteristics of the sounds fed into the effect.

A vocoder is essentially a combination of a frequency analyzer and a dynamic EQ. The Modulator signal is divided up into a number of frequency bands, and the levels of each of these bands are measured in real time. A dynamic EQ is slaved to the analyzer, following the changes in each band of the Modulator with similar changes in the EQ of the Carrier. This causes the Carrier to assume some of the timbre of the Modulator. It is best for the Carrier to contain a wide range of frequencies, because if there is little or no material in some of the bands to begin with, the EQ will have nothing to alter, and the Vocoder's effect will be diminished.

The more frequency bands which are used, the greater the definition of the Vocoder effect. To achieve the highest quality Vocoder, the two Stereo Vocoder - Delay algorithms use both effects slots; the four Small Vocoder algorithms use the normal effects configuration, making another effect simultaneously available.

Using the Vocoder to create "talking" Instruments

This Vocoder application uses a single microphone input to modulate internal Patches. To create the talking instrument:

☛ Set up the Analog Inputs, as explained above, with a microphone going into Input 1.

☛ On the Analog Input Assign page, dial up the SINGLE Macro.

☛ Initialize a Performance.

☛ Select the Patch(es) which you would like to be modulated by the Input. It's best to use sounds with a wide frequency range, such as sawtooth-like waves.

☛ In the Performance Part Detail page, set the FX Bus for all Parts to "B."

☛ Select Stereo Vocoder -Delay 1 or 2 as Effect 1 for the Performance. These effects are so powerful that they require both effects slots, so you'll notice that Effect 2 changes to read Stereo Vocoder -Delay also.

☛ Press the soft key FX 1 EDIT, so that you can set up the Vocoder.

☛ On the Vocoder edit page, set the Modulator Bus to "A" (which you assigned Analog Input 1 to, above) and the Carrier Bus to "B" (the Parts in the Performance).

☛ Speak into the microphone while playing the Wavestation A/D with your controller. As you speak, the Wavestation A/D Patches will follow the formants of your voice, so that they appear to talk. Try experimenting with both loud whispers and voiced speech.

You can use this technique with lead lines, for a voice-box effect. You can also achieve a choir-like sound by using choral or vocal Patches as the Carrier(s). Try

using the ROM vocal Patches numbered 9 through 12, such as Air Vox, and playing chords while speaking into the microphone. This should sound like a choir, "singing" your words.

If you wish to use this effect with an external instrument, such as another synthesizer, guitar, etc:

☞ Set up the Analog Inputs, as explained above, with a microphone going into Input 1 and the Carrier source (guitar, other synthesizer, etc.) going into Input 2.

☞ On the Analog Input Assign page, select the A-B STEREO Macro.

☞ Set up the Vocoder as explained in the last example, with A as the Modulator and B as the Carrier.

☞ Play the external instrument while speaking or whispering into the microphone.

This can also be used for special effects, such as making a barking dog or revving car appear to talk.

More Vocoder applications

The above examples use pitched sound as a Carrier; you might also try using noise. ROM waves 70 (New Pole), 117 (White Noise), and 118-122 (Spectrum 1 through 4) are good for this purpose; modulating these sources with speech or percussion can produce interesting results.

Speech effects are the most commonly used application of the Vocoder, and they're what the first vocoders were designed to do; but they are not by far the limit of its capabilities. Using internal sounds as both Carrier and Modulator is a way to achieve new, dynamic timbres. You can, for instance, combine Vector and/or Wave Sequence sounds in this cross-timbral synthesis, and then store them as a new Performance. In addition to modulating one sound with another, it's possible to use a single sound to modulate itself. To do this, either place the same sound on two Parts (similar to the example above), or simply assign the FX Bus of a single Part to 50/50.

Another interesting application is to use a rhythmic, percussive Wave Sequence as the modulator, and a bright pad as the carrier. The pad will be "triggered" by the Wave Sequence's percussion. This is especially effective when using a sequencer and synching Wave Sequences to MIDI Clocks, so that the Vocoder timbre creates a cool, percolating rhythm track.

Vocoders and the Effects Mix

The Effects Mix Series routing works in a special way with the Stereo Vocoder-Delay effects, so that the Wet/Dry Mix controls how much of the original sounds of Buses C and D are heard, without affecting the level of the Vocoder output. Wet means that only the Vocoder output is heard, and Dry means that Buses C and D are heard at full volume, along with the Vocoder output. You can use this feature to route sounds around the Vocoder to the A/B outputs, or - by using buses C and/or D as the Modulator - to blend in some of the Modulator's original sound. If you wish to pass through only the high frequencies of the Modulator (a typical vocoder application), use the Vocoder's Sibilance parameter instead.

Remember that, because the designation of Carrier and Modulator is based on the FX Bus, you must make sure that any applicable settings on the Patch FX Bus Assignment and Analog Input Assign pages, as well as the Performance Part Detail FX Bus parameter, are configured appropriately.

11 APPLICATIONS AND SOLUTIONS

11.1 WIND CONTROLLERS

The capabilities of the Wavestation A/D are well-suited to work with MIDI wind controllers. Setting up the Wavestation as a whole for a wind controller takes several small adjustments to its MIDI configuration, and converting an individual Performance for breath control is a matter of a few simple steps, first on the Performance Part Detail page, and then on several of the Patch Macros pages.

Setting up MIDI

☞ Set your wind controller to send Breath Controller.

☞ On the MIDI page, set MIDI Controller 1 to BREATH CONTROLLER. This means that breath control can be used as a modulator anywhere in the Wavestation A/D by calling up MIDI 1 as a mod source.

☞ Also on the MIDI page, set the Basic Channel to match the channel of your controller.

☞ On the same page, set MIDI Mode to POLY. It isn't necessary to use MIDI MONO mode.

☞ Go to the MIDI RECEIVE page, and make sure that Controllers are set to ENABLE. This will ensure that the Wavestation A/D is receiving Breath Controller messages.

Modifying a Performance for a Wind Controller

☞ Find a Performance which sounds interesting to you.

☞ Go to the Performance Part Detail page of the first Part (path: EDIT-DETAIL); set the Mode to UNI LEGATO, and the Key Priority to LAST. Some of the factory Performances, such as ROM 4 Mini Lead, are already set up this way. Repeat this procedure for each Part in the Performance, and then save the Performance by going to the Write Performance page.

If the Performance is from the ROM Bank, you'll have to save it to a different location in RAM1, 2,or 3, or on a Program Card.

☞ Go to the Edit Amp page of the first Part's Patch (path: EDIT-PATCH-MACROS-AMP). Set the Wave parameter at the top of the page to ALL, or A if it is a one-oscillator Patch. Change the Amp Macro to DEFAULT, which is an envelope with an abrupt attack and a short release.

☞ Go to the Edit Amp Mod page of the first Part's Patch (from the Edit Amp page, press the AMP MOD soft key). Check that the Wave parameter at the top of the page is still set to ALL , or A if it is a one-oscillator Patch. Set Source 1 to MIDI 1, and then go to the Amt (modulation amount) parameter at the right side of the page. Turn the amount for Source 1 to +127, and the amount for Source 2 to 0. Additionally, set the Velocity Envelope Amount to 0.

This means that the Patch's volume will be completely controlled by the breath output of your instrument.

☞ Go to the Edit Filter page of the same Patch (from the Edit Amp Mod page, press the FILTER soft key). The way in which you convert the filter to breath control will depend on your own taste and the nature of the Patch; you may want breath to have very little effect on the timbre, or you may wish for it to have complete control.

As a starting point, make sure that the Wave parameter is set to ALL , or A if it is a one-oscillator Patch. Envelope 1 is usually one of the modulation Sources; replace this with MIDI 1. This should give you a suitable amount of breath control on the filter; if you like, you can come back later and tweak it to perfection.

☞ Save the edited Patch by going to the Write Patch page. If the Patch is from the ROM Bank, you'll have to save it to a different location in RAM1,2,or 3, or on a Program Card. Keep in mind that any other Performances which use this Patch will also be changed.

☞ Repeat the above three steps for each Part in the Performance, and you're ready to play!

Changing Performances via MIDI

The Wavestation A/D's five internal Banks are grouped into three MIDI Banks. MIDI Bank 0 is comprised of RAM1 and RAM2, MIDI Bank 1 of ROM and CARD, and MIDI Bank 3 of RAM3. Performances within these MIDI Banks may be selected, as always, by using Program Change messages, but switching from one MIDI Bank to another - from RAM2 to ROM, for instance - requires the use of the MIDI Bank Select message (Controller #32). For more information on MIDI Bank Select, please see Section 5.8, MIDI Bank Select and Program Change.

Since many older controllers do not offer an easy way of sending the recently implemented MIDI Bank Select message, you may find it convenient to use the Performance Select Map. This feature allows you to assign any incoming MIDI Program Change number to any Wavestation A/D Performance, without using Bank Select. For more information on the Performance Select Map, please see Section 5.10.

Advanced Wind Controller Tips

The Wavestation allows you to change Performances without disrupting the reverb effect. To do this, the Performances you are changing between must use the same reverb algorithm (Small Hall, for instance) in the same effects slot (such as FX 2) of the same configuration (eg., Serial). You can also do this when changing from a Parallel to a Serial effects configuration (or vice versa), as long as the reverb is in the FX 1 slot.

Although the above example only shows how to assign breath control to alter volume and filter cutoff, the Wavestation A/D's sophisticated modulation matrix allows you to do much more than that. Breath control can be routed to any number of destinations, including pan (through the FX mix), pitch, LFO depth and/or rate, and Wave Sequence step, as well as effects parameters.

The Dry/Wet Mix of the Reverbs, for example, may be modulated. Try setting that parameter to Wet, and then using MIDI 1 (which you assigned to breath control in the above example) as the modulator, with an amount of -15. This means that the harder you blow, the less reverb there is; as you play softer, the reverb increases. Another expressive use of effects modulation is to route breath control to the Hot Spot in the Distortion or Overdrive effects.

11.2 GUITAR CONTROLLERS

Several features of the Wavestation A/D are specifically designed for the use of MIDI guitar controllers. Setting it up to be played from a guitar controller takes only a few small adjustments.

The simplest way to use the Wavestation A/D with a MIDI Guitar is to play the same Performance with each string, so that as you play chords or lines that jump from string to string, the sound remains consistent. Some guitar controllers also have the ability to send out different program changes for each string, allowing you to play different sounds for bass and lead lines, or to achieve special effects. Even if your controller can't send different program changes for each string by itself , you can still get a similar effect by using the Wavestation A/D's Multisets. These three methods are discussed below.

Setting up MIDI

The basic MIDI setup is the same for all the guitar controller methods described below.

☛ Set up your MIDI Guitar controller to transmit in MIDI MONO mode, as described in its manual.

This should cause it to transmit each string's notes on a different MIDI channel. Next, set up the Wavestation A/D to respond to each string independently by putting it in MIDI MONO mode.

☛ On the MIDI page, set the MIDI Mode to MONO, and the number of MONO Channels to 6 - one for each string.

☛ On the same page, set the Basic Channel to match that of your guitar controller. This determines the first of the six channels to which the Wavestation A/D will respond; for instance, if the Basic Channel is 1, the six MONO channels will be 1, 2, 3, 4, 5, and 6.

Changing Performances via MIDI

The Wavestation A/D's five internal Banks are grouped into three MIDI Banks. MIDI Bank 0 is comprised of RAM1 and RAM2, MIDI Bank 1 of ROM and CARD, and MIDI Bank 3 of RAM3. Performances within these MIDI Banks may be selected, as always, by using Program Change messages, but switching from one MIDI Bank to another - from RAM2 to ROM, for instance - requires the use of the MIDI Bank Select message (Controller #32). For more information on MIDI Bank Select, please see Section 5.8, MIDI Bank Select and Program Change.

Since many older guitar controllers do not offer an easy way of sending the recently implemented MIDI Bank Select message, you may find it convenient to use the Performance Select Map. This feature allows you to assign any incoming MIDI Program Change number to any Wavestation A/D Performance, without using Bank Select. For more information on the Performance Select Map, please see Section 5.10.

Playing the same Performance from each string

For this method, you'll use a Multiset as a template, but you won't actually play the Performances or Effects stored in the Multiset. Instead, you'll set up your guitar controller to send out the same program change for each string (for some controllers, this may be the only choice). Additionally, you'll make it so that the Multiset Effects are changed by those same Program Change messages, so that when you call up a Performance to be played, you'll also call up its effects. This makes the Wavestation A/D act almost as if it were in the MIDI Mode POLY, except that each of your strings controls its own monophonic Performance, allowing for more natural guitar voice-leading.

☞   Set up your guitar controller to send out the same Program Change message for each string, consulting your manual if necessary.

☞   Go to the Wavestation A/D's MIDI REMAP page (path: MIDI-REMAP), and set Change Multi FX w/Prog to ENABLED, and Change Multi w/Prog to DISABLED. This enables changing of Multiset Effects with MIDI Program Changes.

☞   Go to the MULTIMODE SETUP page (path: MIDI-MULTISET), and set the FX Control channel to one of the channels which you are sending on - the Basic Channel is a good choice. This determines the MIDI channel on which Program Changes will change the Multiset Effects.

Now, you're set up and ready to play!

Playing different Performances from each string, using Program Changes

In the previous example, you configured your guitar controller to send identical Program Change messages for each of its six strings. The Wavestation A/D, however, can play different Performances - and receive separate Program Changes - on up to 16 MIDI channels, more than enough to allow each string its own, separate sound. If your MIDI guitar is so capable, you can use its master controller functions to determine which Wavestation A/D Performances are played by each string. For more information on multi-timbral operation of the Wavestation A/D, please see Section 5.11, Multimode Setups, of this Player's Guide, and the entries under MIDI RECEIVE and MULTIMODE SETUP in the Reference Guide.

The MIDI configuration of the Wavestation A/D is very similar to that of the previous method, except that you may wish to set the Multiset Effects Control Channel to a seventh MIDI channel, so that effects changes may be controlled separately from Performance changes. For more information on the Change Multi FX w/Prog feature, please see the MIDI REMAP section of the Reference Guide.

☞   Set up your guitar controller to send out the desired Program Change messages for each string, consulting your manual if necessary.

☞   Go to the Wavestation A/D's MIDI REMAP page (path: MIDI-REMAP), and set Change Multi FX w/Prog to ENABLED, and Change Multi w/Prog to DISABLED. This enables changing of Multiset Effects with MIDI Program Changes.

☞   Go to the MULTIMODE SETUP page (path: MIDI-MULTISET), and set the FX Control channel either to one of the channels which you are sending on - the Basic Channel is a good choice. This determines the MIDI channel on which Program Changes will change the Multiset Effects.

That's it! You're ready to go.

Playing different Performances from each string, using Multisets

Even if your guitar controller can't send out separate Program Changes for each string, you can achieve a similar effect by using the Wavestation A/D's Multimode Setups. Each of the 16 Multisets can store separate Performances to be played by each MIDI channel, in addition to effects. You can also set up the Wavestation A/D to use Program Change messages to switch between Multisets. For more information on Multisets, please see Section 5.11, Multimode Setups, of this Player's Guide, and the entries under MIDI RECEIVE and MULTIMODE SETUP in the Reference Guide.

☞ Set up your guitar controller to transmit Program Change messages in a simple fashion, so that its program 1 sends out Program Change #1, program 2 sends out Program Change #2, and so on.

☞ Go to the MIDI REMAP page (path: MIDI-REMAP), and set Change Multi w/Prog to ENABLED, and Change Multi FX w/Prog to DISABLED. This will cause Program Changes on the Basic Channel to change the current Multiset. For more information on this feature, please see the MIDI REMAP section of the Reference Guide.

☞ Go to the PERFORMANCE SELECT MAP page (path: MIDI-PERFMAP), and make sure that the Map is set to DISABLED. This will ensure that MIDI Program Change #1 calls up Multiset #1, Program Change #2 calls up Multiset #2, and so on.

☞ Go to the MULTIMODE SETUP page (path: MIDI-MULTISET), and assign the desired Performances to each channel.

☞ Go to the EFFECTS page by pressing the EFFECTS soft key, and set up your desired effects.

☞ Before sending a program change from your controller, save the edited Multiset by going to the WRITE page.

☞ Repeat the above three steps to create any other desired Multisets.

After creating the rest of your Multisets, you're ready to play!

11.3 TROUBLESHOOTING

Wavestation A/D Makes No Sound

☞ Perhaps someone has edited the current Performance into silence - try selecting a few from the ROM bank.

☞ As a basic check of the Wavestation A/D audio, press the TEST soft key on the Performance Select page. When TEST is pressed, its label changes to STOP, and the Wavestation A/D will play a middle C on the current Performance. The note will continue to sound until the STOP softkey (or any other button, for that matter) is pressed.

If TEST produces a sound, then your problem is probably in your MIDI system, and you should proceed to MIDI Troubleshooting, below.

If TEST does <u>not</u> produce a sound, then your problem is probably in your audio system, and you should proceed to Audio Troubleshooting, below.

Audio Troubleshooting

☞ Check the MASTER VOLUME knob and volume pedal (if used). The polarity of a Volume Pedal is also important; if this is inverted, the volume will be at zero when the pedal is at maximum. If this seems to be the case, change the polarity of the pedal on the FOOT PEDAL ASSIGN page, under GLOBAL.

☞ If you still do not obtain audio output, it is easy to check whether the problem is in the Wavestation A/D or your sound system by plugging headphones directly into the front panel PHONES jack. If you can hear sound through the headphones, check the connections to your sound system.

☞ If you don't hear any sound through the headphones, do the MIDI check explained below.

MIDI Troubleshooting

☞ Check that the MIDI Indicator LED, located on the front panel, blinks when you play on your controller.

Blinking indicates that the Wavestation A/D is receiving recognized MIDI data, as set by the MIDI Mode and Basic Channel parameters (see below). When you play your controller or sequencer, you should see this light blinking.

☞ If the MIDI Indicator LED is not blinking, check to see that your MIDI cable connections are properly made (MIDI Out from your controller or sequencer to MIDI In on the Wavestation A/D).

If you are using a MIDI patch bay, or the "through" function of a sequencer, try directly connecting the MIDI Out of your controller with the MIDI In of the Wavestation A/D.

If the connections seem to be OK, but the MIDI LED still is not blinking, make sure that the Wavestation A/D is set to receive the channel on which your controller or sequencer is sending. First, find out what channel is being sent by going to the MIDI Status page, which is a more sophisticated version of the MIDI LED. It displays an asterisk (*) under the number of each MIDI channel on which the Wavestation A/D is receiving MIDI data, whether or not that channel is being

recognized. If your controller is sending on channel 3, for instance, you will see an asterisk under the "3" every time you press down a key.

☛ Go to the MIDI STATUS page (path: MIDI-STATUS). Play on your controller, and note the channel number(s) under which an asterisk (*) appears.

Next, press EXIT to get back to the MIDI page, and check to see which MIDI Mode (OMNI, POLY, MULTI, or MONO) the Wavestation A/D is currently in.

☛ If it is set to OMNI Mode, the Wavestation A/D will respond to MIDI information on any channel. If the STATUS page showed any activity, then, you should be hearing something. If you aren't, check again to see that the audio connections are OK.

☛ If it is set to POLY Mode, then the Wavestation A/D will ignore all MIDI data except that which it receives on its Basic Channel. Adjust either the Wavestation A/D's Basic Channel or your controller's send channel so that they match.

☛ If it is set to MULTI Mode, go to the MULTIMODE SETUP page (reachable by pressing the MULTI softkey on the MIDI page). In this mode, the Wavestation A/D can receive on up to 16 channels simultaneously. Check to see that the desired channels are turned ON (the second column), and that their levels are reasonably high (the third column).

☛ If it is set to MONO Mode, note the (#) MONO CHANNELS parameter to the right of the Basic Channel. This sets the total number of channels to be used. These begin with the current Basic Channel, up to the number of mono channels requested, to the limit of 16. For example, if the Basic Channel is set to 1, and the "# MONO Channels" set to 6, then the Wavestation A/D would receive MIDI on channels 1 through 6. Check that these parameters are set appropriately.

This mode, like MULTI, uses Multisets to assign Performances to the different MIDI channels. Go to the MULTIMODE SETUP page by pressing the MULTI softkey on the MIDI page, and check to see that the desired channels are turned ON (the second column), and that their levels are reasonably high (the third column).

There are a few MIDI parameters which can cause silence regardless of the current MIDI mode.

☛ In a MIDI network, a controller can send unintended low Volume control messages. If you think this is the case, try raising the same controller, or reset the Wavestation A/D by cycling power off, then on.

☛ Check that the Play Mode on the PERFORMANCE PART DETAIL page is set to BOTH or LOCAL for each Part. If any are set to MIDI, they will not sound, but will only continue to transmit MIDI Program changes and controller data from the joystick and any connected pedals.

For more information on the Wavestation A/D and MIDI, see Section 5 (MIDI).

The Wavestation A/D doesn't respond to some MIDI notes

☛ Check that the Note On/Off parameter on the MIDI RECEIVE page is set to ALL.

This feature is designed to allow you to link two Wavestation A/Ds (or an A/D and a Wavestation keyboard) together. Setting one instrument to EVEN and the other to ODD causes each to ignore half of the MIDI notes (playing a single whole-tone scale), effectively doubling the available polyphony. Unless you have two modules operating in this manner, Note On/Off should be set to ALL.

Notes cut off unexpectedly

☛ Check the All Notes Off parameter on the MIDI RECEIVE page, and try setting it to IGNORE.

Some controllers send this MIDI message whenever there are no keys held down, and this can occasionally cause notes to cut off; ignoring the message will solve this problem.

The Analog Inputs sound distorted

☛ Check the LED Level indicators on the front panel. If the clipping LED is lit, adjust the Gain and Level controls on the back panel.

For most synthesizers, mixers, electric guitars, and signal processors, the Gain switch should be at the middle setting of -10 dB. For microphones, it should be at the lowest setting of -40 dB. For some professional audio equipment, the highest setting of +4 dB should be used.

After setting the Gain switch, fine tune the input volume by adjusting the Level knob.

When Analog Inputs are used, polyphony is reduced

If you are using the Analog Input Assign page to route the Inputs to the effects, the Wavestation A/D reserves 2 voices for each Input; if you use the Inputs as waves, all 32 voices are available.

Local footpedals do not function correctly

If you are using a footpedal plugged into the back of the Wavestation A/D, as opposed to over MIDI, and the pedal seems to be functioning oppositely from the way that you would expect (sustaining when it is not depressed, and damping when it is depressed, for example), the polarity of the pedal may be set incorrectly.

☛ Try changing the Polarity parameter for that footpedal on the FOOT PEDAL ASSIGN page.

If you are using the pedal as MOD PEDAL or FX SWITCH, remember that the values may be scaled and inverted at the modulation destination. A positive value from the pedal, then, may produce a decrease in modulation, depending on the settings of the Patches and Effects in the current Performance.

Only one step of a Wave Sequence is being played

There are several possible causes for this situation.

☞ Check the Wave Sequence Sync parameter on the Global page. Unless you are specifically using MIDI clocks to control the playback of the Wave Sequence, this should be set to INTERNAL. If you <u>are</u> intending to use MIDI clocks for sync, make sure that your clock source - probably a sequencer or drum machine - is indeed sending MIDI clocks, and that its MIDI Out is connected to the Wavestation A/D's MIDI In. MIDI Time Code is not the same as MIDI Clocks, and will not work for this purpose.

☞ Check that the SOLO soft key on the Wave Sequence page is <u>not</u> marked by brackets, which indicates that SOLO is on. If it is, press the soft key again to turn it off.

If SOLO is on, only the currently selected Wave Sequence Step is played.

☞ Check that the Mod Amount parameter on the Wave Sequence Utilities page is set to greater than 0, or that the Mod Source parameter is set to Linear Keyboard, Centered Keyboard, Linear Velocity, or Exponential Velocity.

If the source is not one of the four listed above, and the Mod Amount is set to a very small amount (such as 0), then only the start step of the sequence will be played.

ROM Wave Sequences cannot be edited

Each time you make any change to a Wave Sequence, the change is saved. Since you cannot write to ROM, you cannot directly edit a ROM Wave Sequence. If you first copy the Wave Sequence to a RAM bank, you can then edit it as much as you like.

☞ Go to the UTILITIES page, under GLOBAL, and copy the ROM Wave Sequence into either the RAM1, RAM2, RAM3, or CARD banks. It may now be edited.

Wave Sequence does not seem to sync to MIDI

☞ Check that Wave Sequence Sync parameter on the GLOBAL page is set to MIDI.

If this is set to INTERNAL, MIDI clocks will not affect Wave Sequences.

☞ Check that the step durations are in multiples of 6 (12, 24, etc.) for all Wave Sequences in the current Performance.

A duration of 24 equals one quarter note; 12 equals an eighth note; 6 equals a sixteenth note, and so on.

☞ Check that rhythm is not partially due to the Wave Sequence being run through a delay effect. If this is the case, you should adjust the delay time to match the tempo of the MIDI clocks.

☞ For best results when using a sequencer and syncing Wave Sequences to MIDI clocks, quantize all notes playing Wave Sequences to a few milliseconds before the beat. This will ensure that your sequencer will send out the notes before the clock message, so that the Wave Sequence rhythms will be right on the beat.

When a Performance is used in a Multiset, not all Parts are heard

When the Effects Mix of a Performance is changed, not all Parts are heard

If you have changed the FX Mix of a Performance, or if you are using it in a Multiset and have not explicitly copied the effects from the original Performance, waves assigned to the C and/or D buses may not be heard.

☛ Check the Mix 3/4 parameters on the EFFECTS MIX page, and make sure that these are not set to OFF. If they are, change them to another setting.

If any of your Parts are assigned to the C,D,or C+D FX Buses (or if the Part is assigned to Patch, and the Patch FX Bus Assign has Waves which are routed to only C and/or D), and you are using only the stereo outputs, then it is necessary to use the Mix 3/4 parameters on the FX MIX page to route those Parts to the stereo outs. ROM 0 Wave Song is an example of such a Performance.

Performance Effects seem to have changed

If Effects have been set to DISABLE on the GLOBAL page, no effects will be heard.

☛ Go to the GLOBAL page, and make sure that the Effects are set to ENABLE.

When you play a Performance in MIDI MULTI or MONO modes, it is processed through the effects for the current Multiset, as opposed to its own effects.

☛ Check the MODE parameter on the MIDI page. If this is set to MULTI or MONO, the Performance is using the effects of the current Multiset (which may be accessed through the MULTI button on this page).

☛ Change the MIDI MODE to OMNI or POLY, which will enable the Performance to use its own effects.

☛ On the EFFECTS COPY page, copy the effects from the desired Performance into the Multiset.

Performance Effects cannot be edited

Multiset Effects cannot be edited

There are two sets of effects in the Wavestation A/D: those that belong to Performances, and those that belong to Multisets. The MODE parameter on the MIDI page determines, among other things, which set of effects is in use. If the MIDI MODE is set to OMNI or POLY, the Performance effects are heard; if it is set to MULTI or MONO, the Multiset effects are heard.

Only the effects currently in use may be edited. Thus, if you are in OMNI or POLY modes, Multiset effects cannot be edited; if you are in MULTI or MONO modes, the Performance effects cannot be edited.

Also, if Effects have been set to DISABLE on the GLOBAL page, the effects will not be heard, and cannot be edited.

☛ Go to the GLOBAL page, and make sure that the Effects are set to ENABLE.

11.4 ERROR MESSAGES

ARE YOU SURE?

Generally, any action that alters memorized data needs to be confirmed. Press YES to carry out the action, and NO or EXIT to cancel the action.

BATTERY LOW (INTERNAL)

If you see this indicator, immediately take whatever steps you can to back-up your custom patches by RAM card or MIDI, and then bring the instrument to a qualified repair center.

BATTERY LOW (RAM CARD)

If you see this indication, immediately take whatever steps you can to back-up your custom patches into internal RAM or MIDI. If these are unavailable, you can always write-out crucial data by hand on the data forms provided.

Follow the instructions provided with the card for replacing the battery. After battery replacement, copy desired data to the card.

CANNOT COPY STEREO VOCODER FX PARAMETERS - USE COPY FX ALL

Since the Stereo Vocoder-Delay 1/2 effects take up both effects slots, it doesn't make sense to copy them to a single slot. To copy these effects to a Performance or Multiset, use the COPY EFFECTS ALL page instead. To get to this page, go back up to the EFFECTS page, and press COPY.

CANNOT COPY ALL STEPS - NO MORE STEP MEMORY AVAILABLE

CANNOT INSERT STEP - NO MORE STEP MEMORY AVAILABLE

These may appear when you are inserting or copying. The total Wave Sequence memory per bank is 500 steps. One sequence can have a maximum of 255 steps.

The only way to get more steps is to clear unused sequences. The easiest way to clear a large sequence is to copy a tiny sequence over it.

CANNOT WRITE TO ROM CARD

You tried to write to a ROM card.

CARD IS NOT FORMATTED

Cards must be formatted before they can be used by the Wavestation A/D. For Card formatting, see the GLOBAL page.

CARD NOT INSERTED

A Card must be inserted for the operation to work.

EFFECTS ARE DISABLED

When Effects has been set to DISABLE on the GLOBAL page, they may not be edited. To edit the effects, go to the GLOBAL page and set Effects to ENABLE them.

GLOBAL CARD PROTECT SETTING IS ON

You tried to write to a RAM Card while GLOBAL Memory Protect CARD was enabled. To un-protect the memory, go to the GLOBAL page.

GLOBAL INTERNAL MEMORY PROTECT IS ON

You tried to write to RAM 1, 2, or 3 while GLOBAL Memory Protect Internal was enabled. To un-protect the memory, go to the GLOBAL page.

KORG CARD FORMAT MISMATCH

The KORG PROG DATA card inserted is not formatted for the Wavestation A/D or Wavestation keyboard. If it is a RAM card, you can format it (see UTILITIES). Specifically, you cannot use M1/M3r/T-series Program cards without re-formatting them (and thus erasing all of the M1/M3r/T-series data).

MUST EDIT MULTI FX IN MULTI/MONO MODE

When the MIDI Mode is set to OMNI or POLY, Multiset effects cannot be edited. To edit the effects of the Multiset, change the MIDI Mode to MULTI or MONO.

MUST EDIT PERF FX IN OMNI/POLY MODE

When the MIDI Mode is set to MULTI or MONO, Performance effects cannot be edited. To edit the effects of the Performance, change the MIDI Mode to OMNI or POLY.

PART IS EMPTY

You have tried to edit a Part which has no Patch assigned to it. Assign a Patch, or move to a different Part.

PROTECTED CARD

Card protection is set on the card itself. Flip the switch on the front of the card before attempting to write to it (and remember to flip it back after you're done!).

SYSEX TRANSFER COMPLETED

Confirms successful data transfer.

SYSEX CHECKSUM ERROR

A data error occurred during SysEx reception.

This message will remain on the screen until you press the CONT softkey. SysEx dumps contain a large amount of data, and it is possible for small parts of it to become garbled. Normally, simply re-transmitting the data is all that is needed. If this does not work, try using another MIDI cable. It is also possible that the stored data itself has become corrupted...which is why it's always good to keep several backups of all important data.

SYSEX WRITE PROTECT ERROR

You must turn Write Protect OFF (GLOBAL page) to receive sysex dumps of Performances, Patches, or Wave Sequences. If you are dumping to a RAM bank, make sure that Memory Protect Internal is OFF. If you are dumping to a RAM Card, make sure that Memory Protect Card is OFF.

12 APPENDIX

12.1 SPECIFICATIONS AND OPTIONS*

System:	Advanced Vector Synthesis.
	24-bit digital processing, 19-bit DAC.
Wave Memory:	484 sampled and single-cycle waveforms.
Program Memory:	1 ROM Bank, 3 RAM Banks, and 1 Card Bank
Tone generator:	20 bit resolution
	32 voices including individual filters, amps, LFOs, and envelopes.
Macros:	Voicing templates for Pitch, Filter, Amp, Pan, Env1, Analog Inputs, and Keyboard/Velocity Zoning.
Effects:	55 effects programs. Up to 6 simultaneous digital effects, with dynamic modulation.
Performances:	200 internal, 50 in card.
Patches:	140 internal, 35 in card.
Wave Sequences:	128 internal, 32 in card.
Wave Sequence Steps:	2000 internal, 500 in card.
Multi-Mode Setups:	16 configurations of multi-timbral, 16-channel MIDI reception.
Performance Controllers:	Joystick and Master Volume.
Control inputs:	Assignable footswitch/pedal 1 and 2.
Card slots:	PCM data, PROG data.
MIDI:	IN, OUT, THRU.
	Extensive Multi-timbral capability.
Display:	64 x 240 pixel back-lit LCD with soft-key menu system.
Inputs:	Analog Inputs 1, 2 with 64x oversampling ADC.
	Sensitivity (referenced to 0.775v RMS, high impedance): Mic -40 dBu, Line -10 dBu, Pro +4 dBu
	Input Impedance: 47 kΩ
Outputs:	1/L, 2/R, Balanced 1/L, 2/R, 3, 4, headphone
Power consumption:	12 W
Dimensions:	430 (w) x 89 (h) x 406 (d) mm
Weight:	5.1 kg
Options:	RAM card (MCR-03), ROM card (WPC-XX), PCM card (WSC-XX)
	Foot Controller EXP-2,
	Damper Pedal DS-1,
	Footswitch PS-2

Specifications, operations, and appearance are subject to change without notice.

12.2 PERFORMANCE DATA FORMS

Performance Bank, Number, Name:									
Part#	1	2	3	4	5	6	7	8
PATCH								
Bank								
Number								
Name								
ZONES								
Key Low								
Key High								
Velocity Low								
Velocity High								
DETAILS								
Level								
FX Bus								
Delay								
Transpose								
Detune								
Sustain								
Play Mode								
Scale								
Mode								
Key Priority								

EFFECTS	Effect 1		Effect 2		Routing	
Mix3	Mod3	Amt3	Mix4	Mod4	Amt4	

Performance Bank, Number, Name:									
Part#	1	2	3	4	5	6	7	8
PATCH								
Bank								
Number								
Name								
ZONES								
Key Low								
Key High								
Velocity Low								
Velocity High								
DETAILS								
Level								
FX Bus								
Delay								
Transpose								
Detune								
Sustain								
Play Mode								
Scale								
Mode								
Key Priority								

EFFECTS	Effect 1		Effect 2		Routing	
Mix3	Mod3	Amt3	Mix4	Mod4	Amt4	

12.3 EFFECTS DATA FORMS

KORG Wavestation A/D Effects Data			
EFFECT			
Number	Parameter Name	Value	Notes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

KORG Wavestation A/D Effects Data			
EFFECT			
Number	Parameter Name	Value	Notes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

12.4 PATCH DATA FORMS

KORG Wavestation A/D Patch Data

GENERAL	Bank										MACROS	
#/Name											Pitch	
Waves	ALL	A	B	C	D						Filter	
Structure	4	2	1								Amp	
Hard Sync	OFF	ON									Pan	

WAVES						FX-BUS				PITCH	
Osc	Bank/#/Name	Lev	Semi	Fine	Slope	A	B	C	D	Pitch Wheel Range	
A										Pitch Ramp Amt	
B										Ramp Time	Vel Amt
C										Source 1	Amount
D										Source 2	Amount

MIX ENVELOPE					
Point	0	1	2	3	4
Mix A/B/C/D %					
Times	X				
Loop		Repeats			

MIX MOD				
X Source 1	Amount	Y Source 1	Amount	
X Source 2	Amount	Y Source 2	Amount	

FILTER		BUS A-B PAN	
Initial Cutoff		Velocity Amount	
Keyboard Tracking		Keyboard Amount	
Exciter Amount		Notes	
Source 1	Amount		
Source 2	Amount		

AMP ENVELOPE						
Point	0	1	2	3	4	Notes
Levels					0	
Times	X					

AMP MOD	
Velocity Env Amount	
Source 1	Amount
Source 2	Amount
Attack Velocity Mod	
Envelope Keyboard Mod	

ENVELOPE 1						
Point	0	1	2	3	4	Notes
Levels						
Times	X					
Velocity Amount						
ENV1 MOD						
Velocity Env. Amount						
Attack Velocity Mod						
Env Kybd Mod						

LFO1		LFO2	
Rate	Initial Amount	Rate	Initial Amount
Shape	Sync	Shape	Sync
Delay	Fade-in	Delay	Fade-in
Depth Mod Source	Amount	Depth Mod Source	Amount
Rate Mod Source	Amount	Rate Mod Source	Amount

For individual wave parameter blocks, please see next page.

PATCH: **WAVE:**

FILTER					BUS A-B PAN		
Initial Cutoff					Velocity Amount		
Keyboard Tracking					Keyboard Amount		
Exciter Amount					Notes		
Source 1		Amount					
Source 2		Amount					

AMP ENVELOPE						
Point	0	1	2	3	4	Notes
Levels					0	
Times	X					

AMP MOD	
Velocity Env Amount	
Source 1 Amount	
Source 2 Amount	
Attack Velocity Mod	
Envelope Keyboard Mod	

ENVELOPE 1						
Point	0	1	2	3	4	Notes
Levels						
Times	X					

Velocity Amount	
ENV1 MOD	
Velocity Env. Amount	
Attack Velocity Mod	
Env Kybd Mod	

LFO1		LFO2	
Rate Initial Amount		Rate Initial Amount	
Shape Sync		Shape Sync	
Delay Fade-in		Delay Fade-in	
Depth Mod Source Amount		Depth Mod Source Amount	
Rate Mod Source Amount		Rate Mod Source Amount	

PATCH: **WAVE:**

FILTER					BUS A-B PAN		
Initial Cutoff					Velocity Amount		
Keyboard Tracking					Keyboard Amount		
Exciter Amount					Notes		
Source 1		Amount					
Source 2		Amount					

AMP ENVELOPE						
Point	0	1	2	3	4	Notes
Levels					0	
Times	X					

AMP MOD	
Velocity Env Amount	
Source 1 Amount	
Source 2 Amount	
Attack Velocity Mod	
Envelope Keyboard Mod	

ENVELOPE 1						
Point	0	1	2	3	4	Notes
Levels						
Times	X					

Velocity Amount	
ENV1 MOD	
Velocity Env. Amount	
Attack Velocity Mod	
Env Kybd Mod	

LFO1		LFO2	
Rate Initial Amount		Rate Initial Amount	
Shape Sync		Shape Sync	
Delay Fade-in		Delay Fade-in	
Depth Mod Source Amount		Depth Mod Source Amount	
Rate Mod Source Amount		Rate Mod Source Amount	

12.5 WAVE SEQUENCE DATA FORM

KORG Wavestation A/D Wave Sequence Data							
WAVE SEQUENCE							
Loop Dir	Start		End		Repeats		
Mod Source				Mod Amt		Start Step	
Step	Bank/#/Name	Semi	Fine	Lev	Dur	Xfade	Notes

2.6 MIDI IMPLEMENTATION CHART
ORG Wavestation A/D

Date: 24 Oct, 1990
Version : 1.1

Function ***		Transmitted	Recognized	Remarks
asic hannel	Default	1 - 16	1 - 16	Memorized
	Changed			
lode	Default	3	1, 3, 4	
	Messages	✕	✕	Mode Messages
	Altered	**********	✕	Ignored
ote umber :		✕	0 - 127	
	True voice	✕	0 - 127	
elocity	Note ON	✕	O (9N, v=1~127)	
	Note OFF	✕	✕	
ter uch	Key's	✕	O	
	Ch's	✕	O	
tch Bend		✕	O	
ntrol ange	0 Bank (msb)	O	✕	
	01 Mod Wheel	✕	O	
	04 Foot Cntrl	O	O	
	06 Data	O	O	
	07 Volume	O	O	
	12 FX Cntrl	O	O	
	16 Joy-X	O	O	
	17 Joy-Y	O	O	
	32 Bank (lsb)	O	O	
	38 Data (lsb)	O	O	
	64 Damper	O	O	
	100 RPN (lsb)	O	O	
	101 RPN (msb)	O	O	
	1-95 Controls	✕	O	Assignable
og ange : True #		0 - 99	0 - 127	
		**********		
stem Exclusive		O	O	
mmon	: Song Pos	✕	✕	
	: Song Sel	✕	✕	
	: Tune	✕	✕	
stem al Time	: Clock	✕	O	
	: Commands	✕	✕	
	: Local ON/OFF	✕	✕	
	: All Notes OFF	✕	O	Note 1, 2
	: Active Sense	O	O	
es	: Reset	✕	✕	
es			1. Ignored in OMNI mode.	
			2. Also Reset All Controllers message.	

le 1 : **OMNI ON, POLY**   Mode 2 : **OMNI ON, MONO**   O : Yes
le 3 : **OMNI OFF, POLY**   Mode 4 : **OMNI OFF, MONO**   ✕ : No

13 INDEX

This index includes citations from both the Reference Guide and the Player's Guide. Citations from the Reference Guide are marked by the legend, "RG;" citations from the Player's Guide are marked by the legend, "PG."

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